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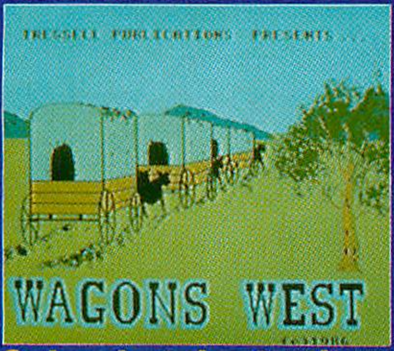
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FEBRUARY 1988

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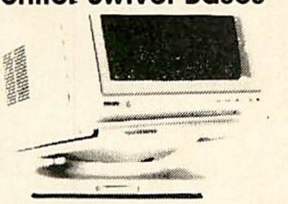
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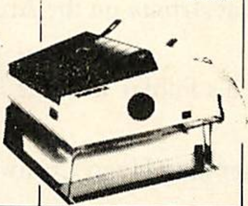
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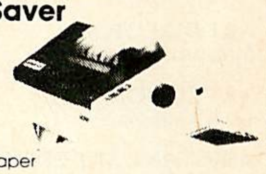
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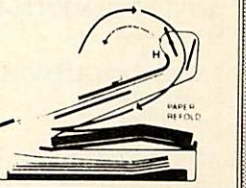
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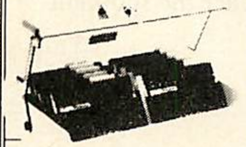
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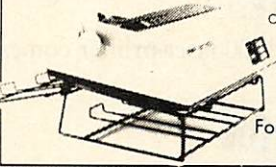
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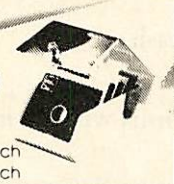
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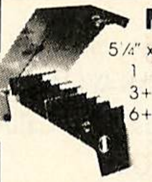
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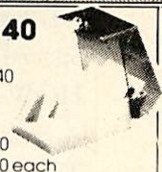
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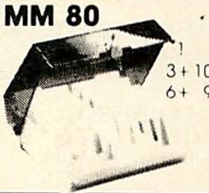
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ISSUE No 67 FEBRUARY 1988

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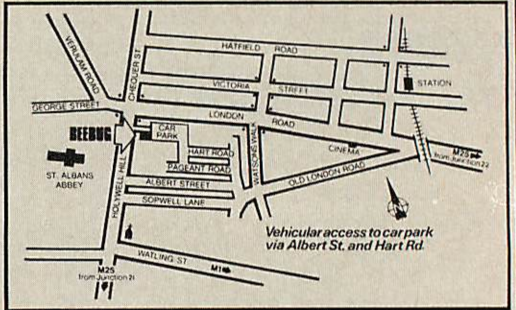
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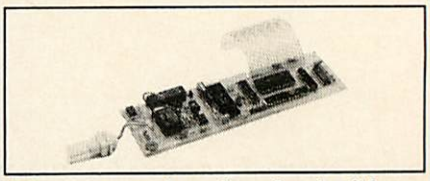
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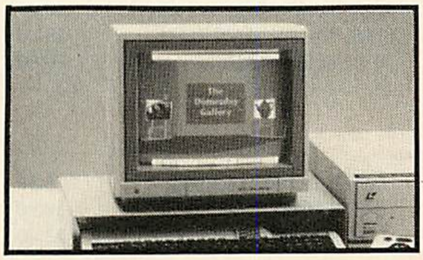
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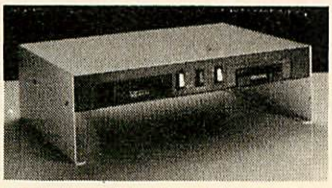
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People who can't make up their minds which disc format to use can now put off their decision for good.

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Twin-format double disc drive

The 5.25-inch drive is switchable between 40 and 80 tracks. The system, called the DP35-800S, comes in a large, sturdy plinth unit which doubles as a monitor platform.

Having two formats on line is useful for anyone who needs to transfer files between BBC micros and Compacts or Arcs.

The drives have their own power supply, and come with the usual utilities disc. The price of the DP35-800S is £202.

Olivetti man for Acorn

Acorn has finally announced a replacement for Brian Long. The new managing director is leading Olivetti marketing strategist, Harvey Coleman. He takes up the job immediately.

Coleman has been in the computer business for 25 years working most recently for Olivetti in both Italy and Britain. Formerly he provided commercial support to customers for British Olivetti and Computer Technology.

He'll use his marketing expertise to ensure Acorn's products 'enjoy the success they surely deserve.'

Arc PC podule put on hold

By Steve Mansfield

Acorn has stopped work on the MS-DOS hardware add-on for the Archimedes while it decides whether the product is worth its while making.



RM Nimbus: The Arc's main MS-DOS competitor in schools

The podule would have offered a high degree of compatibility with IBM PCs and similar machines and would have got around the argument that schools should drop Acorn machines in favour of the MS-DOS industry standard.

Research Machines' Nimbus is the Arc's main competitor for the education market, and stands to gain if the MS-DOS podule is cancelled. The Nimbus is compatible with MS-DOS programs and can also run BBC Basic.

Acorn's Dave Bell confirmed that: 'We have certainly placed any current work on hold while we decide what we do for next year.'

Bell went on to refute suggestions that Olivetti was involved. 'That's a silly rumour,' he said. 'It has no foundation whatsoever. It was purely an Acorn decision, taken as part of our regular product meetings.'

Behind schedule

Although originally planned for late 1987, work on the podule had slipped behind schedule, and it looked as though the second quarter of 1988 would have been the earliest possible launch date.

Bell expressed concern over the relevance of an MS-DOS product which would be based on an old chip, have comparatively low resolution CGA graphics and would be relatively expensive at around £300. The PC-compatible world is moving generally towards the higher resolution EGA graphics, and IBM itself has announced that it will use the even better VGA standard.

Complete PC-compatible computers can be bought for around £500, so the podule might look expensive. However, there may be a demand from schools who want the Arc for its BBC compatibility but would like to run MS-DOS software too. For that reason, Bell explained, the project is only on hold, rather than cancelled forever.

'If we felt there was a large enough demand, it would be worth doing,' he said.

Acorn is still selling the software-based MS-DOS emulator, although this is less compatible than the hardware product. This is because the podule was to have included the PC floppy disc controller chip, which is directly accessed by some software packages as part of their copy protection.

Leading light leaves

Acorn has lost the leading light behind Arthur, the Archimedes' operating system. Paul Fellows, who as microsystems software manager led the Arthur development team, has left to join Cambridge Computer – Clive Sinclair's company which makes the Z88 laptop.

Fellows has been described by an industry source as 'the only person in Acorn who really knows anything about Arthur.' However, having spent a year working on the system with his team, Fellows said his work is 'now about done'. The new job is a career move, he said, and not connected with any dissatisfaction with Acorn. Fellows' job has been filled by an internal appointment.

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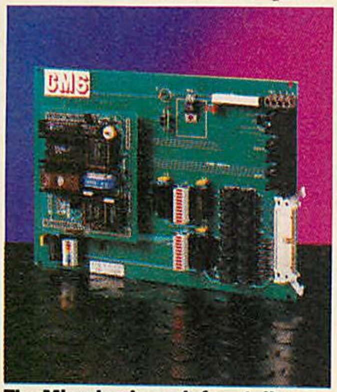
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Seminars on multi-tasking

Cambridge Microprocessor Systems is now offering free half-day seminars and technical support to potential customers for its Microbeeb computer.



The Microbeeb card: free talks

The Microbeeb is a computer card running a multi-tasking version of BBC Basic. Its main uses are in control applications. And it's these applications which have prompted CMS into setting up the seminars.

Low cost Arc video card

Low cost interactive video on the Archimedes may soon be possible thanks to a new podule from Wild Vision. The device, known as the Chromalock, provides genlock and video overlay facilities, allowing you to combine video images with the Arc's text and graphics.

The two image sources can be combined while editing, or mixed during the original recording. This could make the system popular in scientific applications, as technical data can be superimposed in real time over images from a camera.

Versions for the Master and BBC B micros are also being produced. In fact, there are no less than six versions available, ranging from a basic genlock card at £160, to a professional package for the Arc at £408.

Acorn sacks 49 staff

Acorn has got rid of a fifth of its workforce. A total of 49 people were told to clear their desks immediately in a move which affected almost every section of the company. Two were later taken back.

The sackings are seen as a way of concentrating Acorn's efforts on its more profitable and promising ventures – especially RISC-based products and successful lines such as the Master. Acorn has made several unsuccessful forays into customised products, and is also thought to be disappointed about sales of the Domesday interactive video system.

'The bespoke products were simply not providing the kind of return we were looking for,' said Michael Page, Acorn's corporate communications manager. 'It's not that the customers were unhappy with the products – we just couldn't get enough customers.'

Informed sources say that the person behind the dismissals was Bruno Soggiu, the Olivetti man put in as Acorn's chairman, and until December Acorn's managing director.

■ This move comes at a time when the air is thick with unconfirmed rumours about Olivetti interfering with Acorn. This is felt my many to be the reason for former MD Brian Long's sudden departure.

However, Page denied rumours that Acorn's Palo Alto research centre in California, which has been involved in development work based on RISC technology, has now been taken over by Olivetti.

'Acorn and Olivetti have been working together there for some time.'

Arc ROM add-on

Computer Concepts has just released details of its ROM/RAM podule for the Arc. It takes up to seven chips, which can be ROM software or RAM, and vary in size up to 128k each. The total capacity is 896k, but more than one podule can be fitted to a machine.

The podule slots directly into 400-series machines, but the 305 and 310 models will need the backplane add-on.

The RAM can be used as a RAM-disc filing system, and comes with a full set of Acorn compatible commands. Battery backup is available as an optional extra, so that the contents of the RAM can be preserved when the machine is switched off.

The *Inter* series is being made available on ROM chip to fit the podule.

The podule costs £57, or £68 with the battery fitted. Computer Concepts will also supply RAM chips at prices from £5.75 for an 8k chip to £9.90 for 128k.

Gold replies on prices

Telecom Gold has refuted claims that its change in pricing structure will significantly increase bills for users.

The company dropped its time charges, but added a charge for the amount of data transmitted. According to Telecom Gold, this has resulted in an average price increase of seven per cent. This is 'not unreasonable' according to Gold, as it's the first increase in two years.

Users who tend to transmit a large amount of text, which includes we humble journalists, may have noticed a larger increase in bills. The price structure changes really benefit those people who log on, quickly check their mail and log off again, particularly if they are using high speed modems. This is particularly true since Gold make the first 512 characters free.

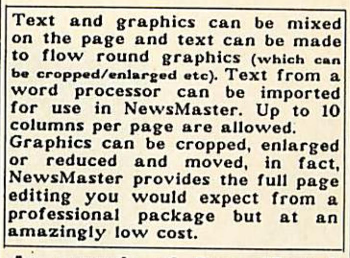
Customers who are making the most of Gold's services will tend to suffer more.

First DTP for MS-DOS Arc

The MS-DOS emulator for the Archimedes has already got its first software package. *NewsMaster* is a desktop publishing program originally written for IBM PC compatibles.

The software is designed to work with a wide range of printers, including ink jet and laser models, and is capable of using text created in word-processing packages like *View*.

To run the software on ordinary Arcs you need to buy the MS-DOS software emula-



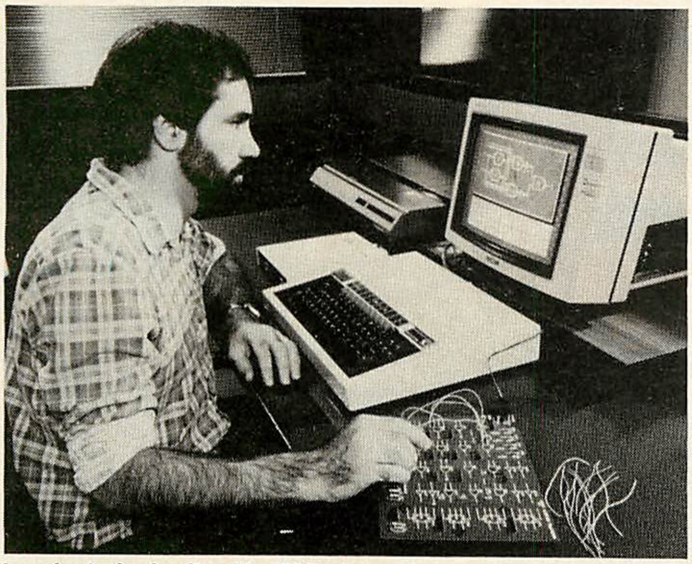
Text and graphics can be mixed on the page and text can be made to flow round graphics (which can be cropped/enlarged etc). Text from a word processor can be imported for use in NewsMaster. Up to 10 columns per page are allowed. Graphics can be cropped, enlarged or reduced and moved, in fact, NewsMaster provides the full page editing you would expect from a professional package but at an amazingly low cost.

An example of *News Master's* output on a dot-matrix printer

tor – this comes supplied free with the 310M. The machine must have at least 1Mb of memory, which means it won't work on the half-megabyte Archimedes 305.

NewsMaster is produced by LTS and costs £69.


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Learning logic circuits with a BBC micro

Teaching electronics with electronics

Electronics engineers can now learn their trade with less danger of getting fried in the process. Epic Industrial Communications has produced an interactive video package called *An Introduction to Digital Electronics*, which works with a BBC micro connected to a laser disc player.

The package is designed for everyone from managers and supervisors to the people who actually get their hands dirty – or burnt.

The basic material for the system has come from training centres run by the electricians' union, the EETPU. The union also worked closely with Epic during the production of the package. The system can be used either as part of conventional classroom sessions, or by the student alone.

The system comes with a special plug-in circuit board known as the Logic Tutor, which means electronic circuits can be attached to the micro (as shown in the picture) and so students can relate directly to what is on the screen.

The course is modular, and so can be bought piece by piece, or just up to the level you need. Units vary in price from £250 to £950 depending on which level you want, though you probably won't get away with spending less than around £1200.

Prize for 'excellent' Domesday Project

The Domesday Project has won an award. The British Computer Society selected the project for a special mention.

The society was clearly impressed by the project. Words like 'seminal' and 'the way forward' were mentioned.

According to society spokesperson, the special award for excellence was made 'for the breadth of its achievement as much as its excellence in any one area.' This is believed to relate to the resulting interactive video system's broad range of applications, from schoolroom to business use.

THE COMMS COLUMN

■ After the demise of Musicnet, Amplinet and Musiclink, Micronet has opened a new music database called Music City. This covers all aspects of computer music, including reviews, features on hardware and software, and a correspondence column.

However, the most exciting feature for BBC users is that the database will contain downloadable files for the Hybrid Music 5000 system. Micronet has reached agreement with the Mechanical Copyright Protection Society (MCPS) to provide for royalty payments to be made where appropriate.

Micronet is hoping that many Music 5000 system owners who are not presently subscribers will be attracted to the system by Music City. It's good to see that the BBC micro is the first machine to be served on the database. It will be interesting to see how BBC computer music fares against the systems on other computers. Micronet can be contacted on 01-278 3143.

■ Following our story last month about *Deputy*, the new Archimedes communications package, Michael Spalter of Synchrotech has told us of a new version. He was at the November *Micro User* Exhibition offering a cut-down version, *Deputy Junior*, for £10, the price being redeemable against the full version when it is ready.

Junior offers auto-dialling viewdata and scrolling terminals, but without the full features. It will work with the Magic, Demon and Designer modems, and any manual modem. Contact them on (0733) 230240.

■ An interesting snippet of information reached me recently concerning the Tandata TM512P modem offer in the 'Modems in Schools' scheme. The protocols used by the modem are Tandata's own, or the 'Communitel standard', which is effectively an emulation of the Dacom 2123AD, the other modem offered under the scheme. This makes the modem difficult to use with general purpose software.

However, the TM512 (no 'P') is a Hayes-compatible modem and is more or less identical except for the ROM containing the command protocol. If a TM512 ROM is placed in a 'P' model, you have a Hayes-compatible modem. Tandata doesn't officially sell the ROM as a product, but it might be worth asking what the company would charge for one. Tandata is on 0684-892421.

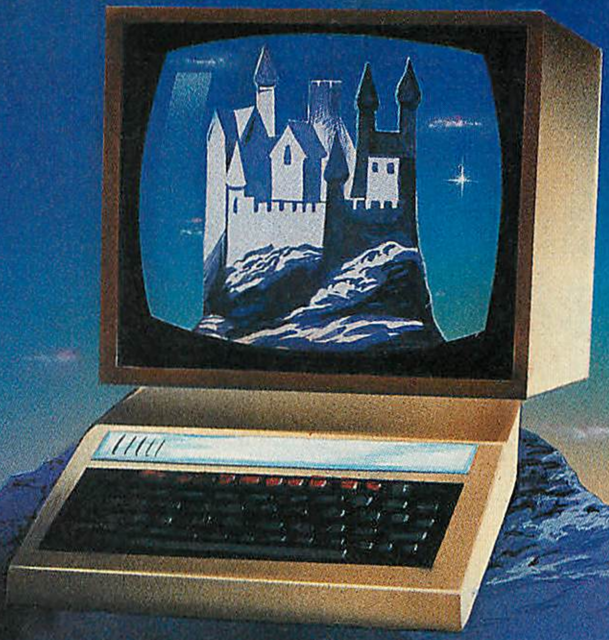
■ Life has got busy in Mirrorworld since we mentioned this multi-user game in December's Comms Column. If you've had no success getting through on (0883) 844164, then you might like to try (0883) 844044. Apparently, Tuesdays and Thursdays are the quietest nights.

■ Further news on the Beebug Master 128 internal modem. This is still in the process of BABT approval, and Beebug isn't selling them until this is granted. The modem is not a re-badging of the long-planned Pace model, but is designed by Anglo, designers of much of the Dataphone range. Dataphone also reports that BABT approval is imminent on its almost identically priced Designer modem. Both modems are V21/V23 auto-dial auto-answer devices. Beebug is on 0727 40303.

■ If you have any comms news items, please send them to David Atherton here at *Acorn User*.

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Fears for computer studies

By Bill Penfold

Fears that computer studies may be 'squeezed out' of the school timetable by the core curriculum have been firmly denied by the Government.

Assurances have been given to Parliament that the subject 'will continue to be treated as a cross-curricular theme'.

Government guarantees for the future of computer studies came after concern was voiced in the Lords by Labour peer Lord Molloy.

He feared that both business studies and computer studies were in danger of being axed as separate subjects. In particular, Lord Molloy suspected the proposed re-organisation of education would result in both subjects being dropped by schools and the new city technology colleges.

But Junior Education Minister Baroness Hooper insisted there was no intention of excluding either subject.

She claimed that once the new national curriculum was in operation both computer and business studies could be taught partly through relevant 'foundation' subjects or as non-foundation subjects.

Lord Molloy, however, was still not convinced. He said he suspected computer studies might end up split and fragmented amongst other subjects. The result, said the Labour peer, could be maths departments teaching programming while the English department taught wordprocessing.

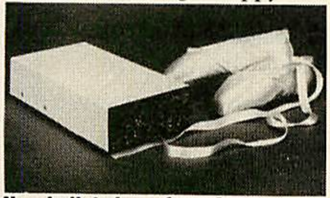
Lord Molloy believed Britain should follow the example of the United States, which he considered was now the world leader in school computer studies. 'In the USA, computer studies constitute a subject taught by specialist computer teachers,' he said.

Lady Hooper believed the Government's new plans would provide 'sufficient flexibility' to allow both approaches.

The Minister went on to point out that two of the specialist groups – set up last summer by Education Secretary Kenneth Baker to help design the new curriculum – had been asked specifically to consider the role of classroom computers in the curriculum.

Delicate discs

Hard discs are getting smaller, or at least Amcom's are. The company has introduced a range of half-height Winchesters, which are now about the same size as a single floppy disc



New ballet shoes from Amcom

drive. The price has been reduced too. A 20Mb model sells for £430. And there is also a new tape streamer to match, at a cost of £599.

Telecom teaches telephones

The next time you get a wrong number or line noise, take heart from the fact that British Telecom really does know something about electronics and phone lines.

The company has just launched three software titles for schools. *Picman* is concerned with digital video signals and their manipulation, *Sigtran* is about sending signals, including the design of a telephone link, and *Pulsmod* is about coverting them to different forms.

BT claims to be subsidising the software, which sells for £15, including manuals.



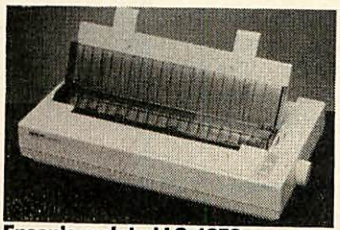
Learning technology from British Telecom

Epson revamps 24-pin printers

Epson has updated its letter quality dot-matrix printers. The LQ850 and LQ1050 are upgrades of the 24-pin 800 and 1000 models. Both new printers feature advanced paper handling, which allows single sheets to be fed in without removing continuous stationery.

Other improvements include lower noise levels and enhanced front panel controls. Recommended prices for the two are £720 for the LQ850, and £960 for the wide carriage LQ1050.

Epson has also introduced a lower priced letter quality printer, the LQ500, for below £500.



Epson's updated LQ-1050

■ A new printer buffer by Typero of Cambridge can cater for serial and parallel printers without the need to buy two units. The device has both parallel and serial connections, and can convert between the two if you want to run a parallel printer from a serial.

You can also add extra sockets. The cost of a 32k buffer is £100. An extra 32k costs £20, with extra ports at £25 each.

Acorn sponsors Raleigh talks

Acorn is doing its bit in supporting Operation Raleigh – the worldwide expedition for young people.

The company is sponsoring a series of lectures based on the findings of the expedition, and is supplying computer equipment to help with presentations and laboratory-based work.

The series of 14 lectures will continue travelling around the country until April.

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SERIAL LINK KIT & DISC

(Available End of December)

This kit enables files to be transferred between BBC and Archimedes, in either direction, with the minimum of fuss. The software is menu driven and is fully compatible with DFS and ADFS. The three metre lead simply connects between the serial ports and the software is loaded via the Archimedes.

Stock code **0796C** Members price **£17.25**

ARCHIMEDES SOFTWARE

1080B	Ansi C	113.85	108.16
1081B	ISO Pascal	113.85	108.16
1082B	Fortran 77	113.85	108.16
1083B	Twin	33.35	31.68
1084B	Logistix	113.85	108.16
0900B	PC Emulator	102.35	97.23
1095B	Artisan	39.95	37.95
1096B	Image Writer	29.95	28.45
1097B	Archimedes Toolkit	39.95	37.95
1098B	Alpha Base	49.95	47.45
0640B	Wordwise Plus Disc	23.00	20.70
1050B	Viewsheet (Emulation)	59.80	56.81
1051B	Viewspell (Emulation)	39.85	37.86
1052B	Viewstore (Emulation)	59.80	56.81
1053B	Viewindex (Emulation)	14.95	14.20
1057B	View (Emulation)	59.80	56.81

ARCHIMEDES BOOKS

1242B	Archimedes Ref. Man.	29.95	28.45
1271B	ARM Assembly Prog.	12.95	12.30

The CC ROM Podule from Computer Concepts, features seven 128K ROM sockets which can have Battery-Backed RAM fitted to them.

Available End-December.

0675B	10 x Beebug 3.5" DS Discs	15.79	15.00

OTHER HARDWARE

0805D	CC ROM Podule *(End-Dec)*	56.35	53.53

Carriage

Carriage is denoted by the letter contained in the stock code. A-50p, B-£1, C-£2, D-£3, E-£3.75, F-£5.50, G-£7. When ordering several items, use the highest price code and half of each subsequent code. For courier delivery use code G.

Credit Cards

Access and Visa orders are welcome, and may be placed by letter or telephone (24 hours).

BEEBUG LTD,
Dolphin Place, Holywell Hill, St.Albans, Herts., AL1 1EX.

☎ (0727) 40303

Please telephone for a Free Information pack and Archimedes brochure.

Acorn User discs for Archimedes

Due to popular demand, *Acorn User* is now making the monthly listing disc available in the 3.5-inch format.

Compact and Archimedes owners no longer have to sit in sullen silence, missing out on all those wonderful programs and graphics.

The price is £7.95. Cheques should be made out to Redwood Publishing and orders sent to *Acorn User* Monthly Disc Offer, 20-26 Brunswick Place, London N1 6DJ.

We can transfer the contents of unprotected DFS or ADFS 5.25-inch discs on to 3.5-inch ADFS discs. The cost is £5, or just £3 if you send us a blank ADFS formatted 3.5-inch disc.

It is the readers' responsibility to ensure that they do not breach copyright.

Please include sturdy return packaging for both discs, plus postage, and ensure that all discs are clearly labelled with your name and address and the disc format you use.

Send your orders to the address above. *Acorn User* cannot accept responsibility for loss or damage.

Cambridge buys Arcs for university network

by Carol Atack

Cambridge University has signed a deal to buy up to a thousand Archimedes in the next five years.

The university has announced its future computing strategy. 'Project Granta' will put a computer workstation on many more desks, and link everyone to a fibre-optic network crossing Cambridge.

Although detailed planning has only just begun it seems likely that many of the machines bought will be Archimedes.

The project is being financed partly by the University Grants Committee's computer board, by industrial sponsors and by the Cambridge colleges themselves. The total cost is estimated at £7 million.

'The decision on buying computers will rest with each college and department. So there are unlikely to be vast purchases of any one machine' said Dr David Hartley, director of the computing centre.

However Brent Robinson from the education department was convinced that power of the Archimedes would make it a popular choice.

A 21st century Cambridge with the traditional lecture system replaced by electronic mail and on-line conferences is envisaged. Soon the network will seem no stranger than using a telephone.



Arcs to be linked across the city

POST A PROBLEM

Acorn User has a guaranteed fast reply service for enquiries. Your answer will be returned within 10 working days for just £3 (includes VAT), or your money back.

Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £3. If you want recorded delivery add the cost of this on. Include as much detail as possible, and a disc or cassette if a program is involved, with enough space to record any corrected listing.

Please note: debugging readers' programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the service will only be able to make general comments or suggest a strategy for the reader.

We will answer the problem and return all material received – within a guaranteed 10 working days from receipt. If we fail to match this promise then your cheque or postal order will be returned with the answered question – you can't lose!

ACORN USER READER SERVICE
20-26 Brunswick Place, London N1 6DJ.

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ADDRESS ______

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POSTCODE ______

DAYTIME PHONE NUMBER ______

I enclose a cheque/postal order for £3 and an sae with my problem.

OFFICE USE ONLY Date in:
Date out:
Answered by:

DATATHORN SYSTEMS Ltd

GEORGE HOUSE, 50 SPRING GROVE, LOUGHTON ESSEX IG10 4QD

PRESENT THE INCREDIBLE

EPSON GQ-3500 LASER PRINTER



NO! It is NOT a PHOTOGRAPH nor is it the Datathorn cat, Jingle. It is one of the early experimental Laser prints from Mike Harrison's Archimedes image grabber, soon to be marketed by Watford Electronics. Rick is still doing work on optimising grey codes (as printed in bit matrices) on the GQ-3500. The full size of the picture is 4.25"x3.25". We shall be selling the dump routines in due course.

Congratulations to Jonathan Marsh's production team for last month's advertisement. Although no reproduction is as crisp as the original, they showed that the Epson CAN be used most effectively to do your own typesetting! This advert has again been produced directly on an Epson GQ-3500, BBC B and InterWord. We are not neglecting the Archimedes (see below), but ours is now heavily into development work so is seldom free for advertisement writing!

GRAPHICS:
Several enquirers have asked how the graphics in the January ad. were produced. An early version of our QSTDMP program was responsible. This program takes MODE1 'PAINT' screens from WE QUEST or AMX and puts them into the GQ for printing in text (B/Masters)...........£12.50

ARMDMP:
Still on the subject of graphics, we are designing a program to download pictures drawn using the free 'PAINT' program supplied by Acorn with the Archimedes. Should become available during February at a price...£t.b.a.

FONTS:
We can supply the full range of Epson Font cards (rrp £125 each) which contain various combinations of around 4 to 6 fonts at the reduced price (each) of...............£119.00

Our own first catalogue of software fonts is available. Send (18p) SAE marked FONTS if you want one. Up to 8 fonts can be loaded at a time (for very large fonts a 2 Meg upgrade card, available from us, may prove useful) and are called by embedded commands. We put your selection on disc with a special downloader program at reasonable prices starting at under £10.00 per font.

The SPECIAL OFFER this month INCLUDES a free typewriter style 12cpi font in response to requests from customers who found that they had written or configured a lot of software for FX compatible dot - matrix printers at 12 cpi (elite) size, which is not available on a standard GQ-3500.
If required separately, this disc is....£15.00

LABELS1:
Near to release, our LABELS1 program will print up to 144 labels a minute using data from your keyboard, or assembled by a word - processor, database or your own program. Very friendly to users. (B/Masters/Archimedes) Only...................................£15.90

FORMS1:
Already in use up and down the country, this easy to use program suite allows you to define, edit, save, load and download to the GQ-3500, forms of various types. Text can be inserted initially and/or from most word - processor, database, accounts programs or your own program - with the WHOLE form (including contents) printed in one pass.
(B/Masters/Archimedes).................£17.00

HELP SERVICE:
We are the established authority on using the Epson Laser Page Printer and offer a unique depth of help to our customers when adjusting to this powerful yet friendly machine.
Despite requests, we cannot yet extend this service to others, since this might overload it and reduce its effectiveness to customers.
Our package and news sheets make transition to Laser printer use as painless as possible.

DISC TRANSFER SERVICE:
3.5", 5.25", DFS, ADFS, DOS+, MS-DOS etc..
Complete disc transferred from as little as £5.00. Send (18p) SAE marked "TRANSFERS" for details. Especially useful for Archimedes users. Optional emergency 24hr service!

EPSON GQ-3500 PRINTER PACKAGE includes:
*GQ-3500 Laser Page Printer
*LaserJet+ Emulation card
*Parallel Cable (state computer)
*FORMS1 form design software
*Command Summary Sheet (correct codes!)
*Support Service
*12 cpi Typewriter Download Font Disc
*Delivery
*12 months warranty
All for..............................£1498.80
(NB: RRP of printer ALONE is £1795.00)
*24hr on-site maintenance contract
First year for only....................£95.00
*All Epson accessories at discount prices

****FREE FACT PACK** including sample output and forms if you send large SAE (26p stamp)**

PLEASE NOTE: Archimedes is a trade mark of Acorn Computers Ltd.
All prices exclude VAT. Please add £2.50 p&p to sub £50 orders before VAT.

Our telephone: 01-508 4904

TETRIS



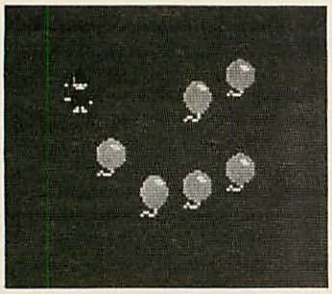
A NEW WORLD FROM RUSSIA

". . . one of the all time computer classics . . . unbelievably addictive . . . it's perfectly simple and simply perfect." **94% Zzap 64**

Available on Commodore 64/128 Tape and Disk · Spectrum Tape and Disc · Amstrad CPC Tape and Disk · Amstrad PCW Tape and Disk · BBC/Electron Tape and Disc · MSX Tape · Atari ST Disk · Amiga Disk · IBM PC and Compatables.

Published by **Mirrorsoft Ltd.** · Athene House · 66-73 Shoe Lane · London · EC4P 4AB

Wizalon won't work



BLUNDERBOX

There was a serious error with the *Wizalon* game listing in the January issue. The following three lines were left off the first listing:

```
10550 .randplay
10560 TAX
10570 LDA rndplaytbl%,X
```

Add these and the game should run perfectly.

We also made a mistake in the January letters section when we informed reader Mary Kelso about a couple of dealers in Aberdeen. Both the dealers we mentioned have gone out of business, although the latter was taken over and now operates under the name of M & M Computers. The company is at Bon Accord House, 41 Albert Street, Aberdeen.

There is a mistake in this month's yellow pages. In line 70 of Acorn Forum listing 2 the word 'or' should read 'of'.

Competition winner

The winner of the Archimedes in October 1987's competition was G Emery, who lives barely half a mile from *Acorn User*'s central London offices. Congratulations, and can we come round for a game of *Zarch*?

The correct answers were:
1) Blaise Pascal, Pascal
2) Gottfried Wilhelm Leibniz
3) Charles Babbage, Ada
4) Hermann Hollerith, IBM, FORTRAN
5) Grace Hopper, COBOL

Acorn User software sale

Many *Acorn User* discs and cassettes are available at slashed prices in our great winter sale on page 142. Here's the chance to complete your collection of *Acorn User* products at a fraction of their normal price. Monthly discs and cassettes are down, all the special cassettes are reduced and special discs are at giveaway prices. A special order form is on page 142.

Contacts

Acorn, Cambridge Technpark, 645 Newmarket Road, Cambridge CB5 8PD. Tel: (0223) 214411.
Amcom, 35 Carters Lane, Kiln Farm, Milton Keynes MK11 3HL. Tel: (0908) 569212.
British Telecom Education Service, PO Box 10, Wetherby, Yorkshire.
Cambridge Microprocessor Systems, Brookfield Business Centre, Twentypence Road, Cottenham, Cambridge CB4 4PS. Tel: (0954) 51122.
Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX. Tel: (0442) 63933.
Epic Industrial Communications, 7 Leicester Place, London WC2H 7BP. Tel: 01-439 1178.
Epson, 388 High Road, Wembley, Middlesex. Tel: 01-902 8892.
LTS, Haydon House, Alcester Road, Studley, Warks. Tel: (0368) 792617.
Tyepro, Freepost, 30 Campkin Road, Cambridge CB4 1BR. Tel: (0223) 322394.
Watford Electronics, 250 High Street, Watford WD1 2AN. Tel: (0923) 37774.
Wild Vision, 6 Jesmond Road, Newcastle Upon Tyne NE2 4PQ. Tel: 091-281 8481.
Windmill Software, Smock House, Hull Lane, Terling, Chelmsford, Essex CM3 2QD. Tel: (024533) 371.

ACORN USER ADVERTISEMENT PAGES FEBRUARY 1988

Archimedes

NEW ACORN APPROVED LONDON DEALER

	Basic	Mono	Colour
Archimedes 305	699.00	749.00	899.00
Archimedes 310	777.00	825.00	975.00
Archimedes 310m	835.00	885.00	1035.00

FREE with Archimedes Sales the excellent new Delta Base from Minerva.

Compact	309.00	349.95	479.95
Master	349.00		
Master Turbo	99.00		
Master 512K	189.00		
Master ET	303.95		
Master Econet Module	40.00		
Master Eprom Cartridge	13.00		
3.5 Disc Dr 400K	86.95		
5.25 Drive 400K single	99.00		
5.25 Drive 400K	99.00		
5.25 Duel 400K P/S	119.00		
5.25 Drive 800K Duel	185.00		
5.25 Drive 800K Duel P/S	205.00		

On demonstration for Archimedes the following:
From Clares:
Artisan, Alpha base, Image, writer and tool kit
From Minerva:
Deltabase, system Delta Plus
From Pineapple software:
Program II
Stock a range of Printer cables and Disc drive leads.

VAT at 15% Access/Visa accepted
Postage & Packing charge extra

AUTOMATIC SERVICES, 217 WOOD STREET, WALTHAMSTOW, LONDON E17 3NT 01-521 1784

Next month in Acorn User

Christopher Adie shows you how to control the Archimedes operating system, via the Arthur WIMP manager, and how to use windows, icons, menus and pointers in your own programs.

Joe Telford concerns himself with controlling robots and reading sensors, using a new Micro Control Language ROM for the BBC micro.

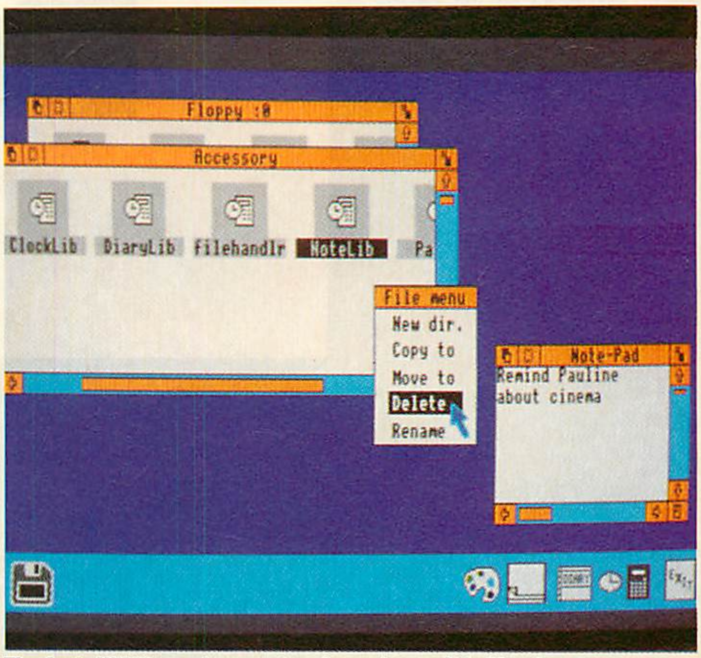
Chris Drage and Nick Evans round up the latest software for the Microvitec touch screen, and conclude that some is ideal for special learning needs.

Your BBC micro can compose tunes that sound like those by modern composers like Steve Reich and Philip Glass. Modern 'systems' music is often based around mathematical or random patterns, and our program emulates these.

In Hints and Tips, Martin Phillips gives a beginners guide to the ADFS, the Advanced Disc Filing System standard with the Master series and Archimedes.

And for sideways RAM users, David Lawrence presents a utility to allow you to make up your own custom ROM images – put your own machine code programs into sideways RAM so they can selected with a simple star command.

Plus, there are all the regulars – on sale February 12.



The Arc's WIMPs environment — learn to use it in March

WINTER SAVERS FROM NIDD VALLEY

DIGIMOUSE



With unique linear lock for drawing straight lines freehand. High quality, precision mouse, available on its own or with a choice of software. AMX compatible.

Digimouse for BBC B/B+/Master or Compact (please state for which computer)
£29.90
(no software)

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★ All prices include VAT post & packing.
★ All peripherals covered by 12 month warranty.
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HOW TO ORDER
By telephone giving ACCESS or VISA number.
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By official educational order (add £2 handling charge).
WHEN ORDERING PLEASE REMEMBER TO STATE FOR WHICH MODEL COMPUTER.

NEW

ILLUSTRATOR graphics software

Illustrator & Digimouse Package.. £44.90

This versatile graphics development program includes an extensive library of designs, plus the facility to design and save your own icons, patterns, fonts and brush styles. Produces high resolution printouts in a choice of 4 sizes and 2 densities with no loss of detail and no distortion. Mouse driven pull-down menus and windows. Every possible drawing function provided. Superb value for money. For BBC 40 or 80 track disc.

£19.90 Illustrator software only

CHAUFFEUR mouse driver utility

With this easy to use utility you can apply mouse control to software written for keyboard or joystick. Supplied as 16K ROM image on disc for loading into Sideways RAM.

Chauffeur for BBC B/B+/Master £9.90
Chauffeur for Compact, including Grafik software £14.95

GRAFIK mouse package

Practical graphics package offering a user friendly introduction to CAD at a low cost. Full colour screen design. Disc includes routines for incorporating mouse control into your own software.

Grafik & Digimouse package BBC B/B+/Master £34.90
(Also available for Compact — see 'Chauffeur' for price)

SLOMO program speed controller

Unique device to slow down or freeze the running speed of any BBC program or screen display. Learn fast action games at your own pace.



Slomo for BBC B/B+/Master/Compact/Amstrad/Spectrum £14.95
(please state for which computer)

RAM-BLOK

For BBC B/B+ users who do not have Sideways RAM fitted, the RAM BLOK provides 16K of SWR for only £14.90

NIDD VALLEY MICRO PRODUCTS LTD
Dept. AU188, Freepost, Wetherby, West Yorkshire LS23 7YP. Telephone: 0937 844661.

128K ROM

MEGA 3

MEGA-3 ROM

A single 128K ROM containing INTER-WORD, INTER-SHEET and INTER-CHART. The package contains all manuals, keystrips and quick reference cards supplied with the individual packages, but the software is *all* on one chip, occupying just one ROM socket.

MEGA-3 ROM is compatible with the entire range of BBC Micros: Model-B, B+, B+128, Master and Compact.

Upgrades: Existing owners may optionally trade-in their INTER-WORD, INTER-SHEET or INTER-CHART for a discount of 25% each. This means that existing owners of all three may obtain a trade-in discount of 75%—a cost of just £21.25 + VAT (£24.44 incl.).

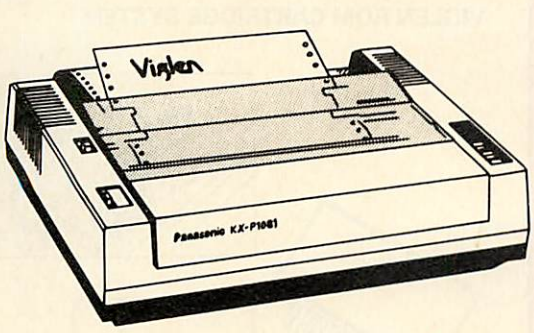
Price: full package £85.00 + VAT (£97.75 incl.).

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead
Herts HP2 6EX. Tel 0442 63933

SPECIAL OFFERS FROM VIGLEN

PANASONIC PRINTER KIT



The Panasonic KX-P1081 come complete with £45.00 worth of accessories FREE including tractor feed and roll feed units with paper, printer cable, and a specially designed metal printer stand.
Features include:

★ 120 cps draft printing 24 cps NLQ
★ IBM and Epson compatibility through dip switch settings
★ Prints 80 coloumns on A4 cut sheets, continuous stationery or roll paper 9 × 9 draft and 18 × 23 NLQ

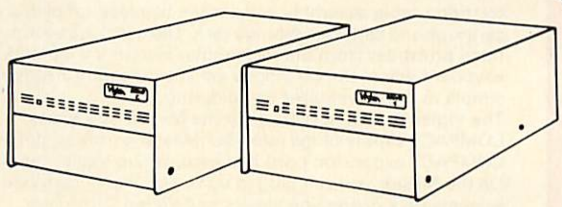
Stock Code	Description	Price inc. VAT
SP079	Panasonic KX-P1081 plus accessories	£185.95

Please add £8 for insured courier delivery.

WINCHESTER

MEGA BYTES FOR MINI BUCKS

NEW LOW PRICES



Plug in 20 to 112 Megabytes of extra storage with the Viglen Winchester system.
The Viglen Winchester is ready to plug in and use on a BBC Master micro; for a BBC B or B plus you will merely need to fit the Acorn ADFS Rom. The Winchesters are 100% compatible with the Acorn Winchester and Acorn ADFS and will also work with the Acorn Master 512 board with DOS plus.
Drive 1 Winchesters are also available for backup or just more storage and simply plug into the back of the Drive 0 unit.
The Winchester package consists of: Winchester unit (cased with controller boards, power supply and fan), Master reference Manual part 1, Winchester user guide and Winchester utilities on disk (such as formatter, verifier, ADFS menu and sophisticated backup program allowing you to make fast backups on DFS disks, ADFS disks or Drive 1 Winchester).

Stock Code	Description	Price inc. VAT
Drive 0 Single		
SP0150	VB20 20Meg Viglen Winchester	£499.00
SP0152	VB28 28Meg Viglen Winchester	£519.00
V155	VB40 40Meg Viglen Winchester	£799.00
V156	VB56 56Meg Viglen Winchester	£899.00
Drive 1 Second Drive		
SP0160	VB120 20Meg Drive 1 Winchester	£479.00
SP0162	VB128 28Meg Drive 1 Winchester	£499.00
V165	VB140 40Meg Drive 1 Winchester	£739.00
V167	VB156 56Meg Drive 1 Winchester	£769.00
V157	20MB Tape Streamer Backup	£689.00
V503	Acorn ADFS Rom and Manual (Only necessary for BBC B or B Plus)	£29.95

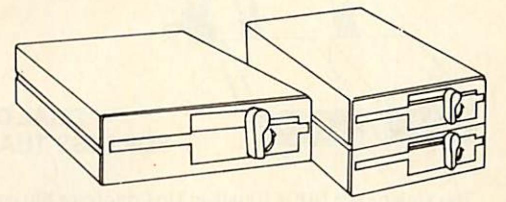
Please add £8 for insured courier delivery.

Available for use with SJ research file server at no extra cost, please specify when ordering.

DISK DRIVES

FROM £99.95 inc. VAT

The finest Japanese disk drives (not Taiwanese immitations) available at the lowest prices.

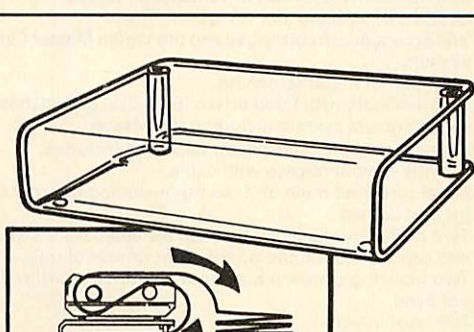


All disc drives are supplied with a manual, packed utilities disc and a full 12 Months warranty (2 Year Warranty available) and are ready to plug in and use on a BBc B (fitted with a DFS) B + or Master micro. 40/48 Track drives have a switch which enables operation in either 40 or 80 track mode.
The capacity quoted are given in single density mode; for double density mode (1770 DFS + ADFS as in the Master) the capacities should be approximately doubled.
An integral power supply is not necessary as the disc drives run from the micro's power source however should you require drives with their own power supply, these are also available.
If your BBC B micro does not have a DFS fitted then you will also require the Acorn dfs kit. These are available from Viglen.

Stock Code	Description	Price inc. VAT
SP014	400K Single Drive 40/80T	£99.95
SP030	400K Single Drive 40/80T + PSU	£109.95
SP019	800K Dual Drive 40/80T	£189.95
SP020	800K Dual Drive 40/80T + PSU	£209.95
VPD0240	100K Single Drive	£105.95
VPD0241	400K Single Drive 40/80T	£113.00
VPD0242	200K Dual Drive	£195.95
VPD0243	800K Dual Drive 40/80T	£219.00
VPD0245	100K Single Drive + PSU	£119.95
VPD0246	400K Single Drive + PSU	£135.00
VPD0247	200K Dual Drive + PSU	£209.95
VPD0248	800K Dual Drive 40/80T + PSU	£235.00
VPD0249	800K Dual Drive 40/80T + PSU in Metal Bridge Unit	£265.00
V0060	3.5" 400K Single Drive	£95.95
V0061	3.5" 800K Dual Drive	£199.95
V0062	3.5" 400K Single Drive + PSU	£135.00
V0063	3.5" 800K Dual Drive + PSU	£199.00
V0064	3.5" and 5.25" 800K Dual Drive	£219.00
V0065	3.5" and 5.25" 800K Dual Drive with PSU	£249.00

Please add £8.00 for insured courier delivery.

PRINTER STANDS



CLEAR PERSPEX PRINTER STAND

The Viglen printer stands are beautifully finished in clear perspex and raise the printer high enough to put continuous stationary underneath.

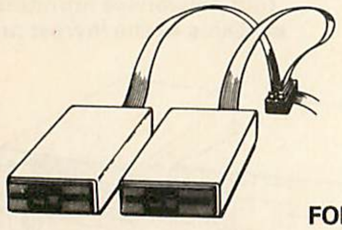
Stock Code	Description	Price inc. VAT
V490	80 Column Printer Stand (15" × 13" × 3.5")	£19.95
V491	136 Column Printer Stand (23.5" × 13" × 3.5")	£29.95

Please add £3 P & P

ORDER FORM ON LAST PAGE OF VIGLEN SECTION

SPECIAL OFFERS FROM VIGLEN

DUCKS



DUAL DRIVES FOR LESS THAN £17!

The Viglen Data DUCK (Dualling Up Connector Kit) converts any two single drives to a dual drive instantly. Simply plug the duck into the micro's disk drive socket and plug two single drives (any type and any make) into the duck to obtain a dual drive system accessed as drive 0 (and 2 if double sided) and drive 1 (and 3 if double sided). If neither single drive has its own power supply then you will require a Viglen power DUCK in order to obtain two disk drive power sockets from the micro.

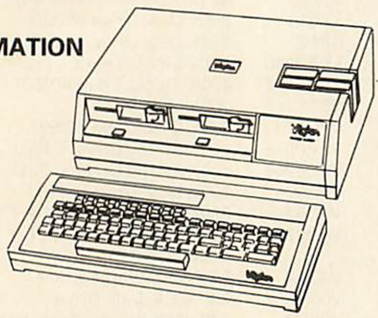
★ No soldering simply plugs in.
★ No need to take disk drives apart to change links.

Stock Code	Description	Price inc. VAT
V084	Viglen data duck	£16.95
V085	Viglen power duck	£7.95

Please add £2.50 for P & P.

CONSOLE SYSTEM

MASTER TRANSFORMATION



Give your BBC Master micro the professional PC look by replacing your existing lid with this smartly styled package. The system is strong and constructed in high impact ABS colour matched to the BBC Master and it gives your Master a very neat and impressive look.

★ Will support monitors including up to 16" TV.
★ Can house two 5¼" disk or Winchester drives.
★ Capable of housing 3½" drives.
★ Will accept Acorn cartridges and the Viglen Master Cartridge system.
★ Full internal metal screening.
★ Also available with fitted drives (5¼", 3½" or Winchester) or as a complete system including the Master.

The Master console unit system packages includes:

★ Remote Keyboard case with cable.
★ Metal screened main unit casing (including internal fittings for 5¼" drives).
★ Two switches which can be used for 40/80 track switching and can be either fitted on the front or rear of unit.
★ Two blanking plates to blank out any drive aperture that is not used.
★ Full labelling kit.
★ Fully illustrated fitting instructions.

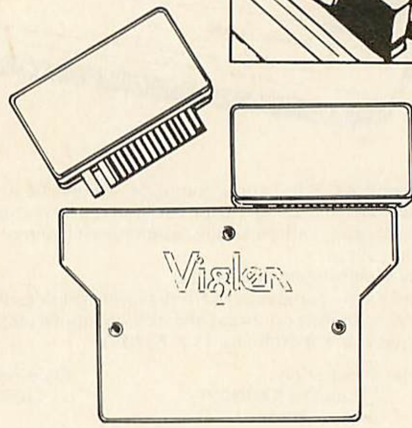
Stock Code	Description	Price inc. VAT
V861	Viglen Master Console unit	£59.95
Accessories for the Master Console unit		
V853	Dual Drive data cable for console unit	£9.95
V854	Dual Drive power cable for console unit	£7.95
V855	Power supply for the console unit	£34.95
V866	Fan Kit for console unit	£34.95
V858	Fitting bracket for 3½" drive	£8.95
V851	Viglen Professional Console Unit for the BBC micro	£49.95
	Fitting service available from	£15.00

Please add £8 for insured courier delivery.

CARTRIDGE SYSTEM

VIGLEN ROM CARTRIDGE SYSTEM





Having fitted the Viglen Rom cartridge system to your BBC, Master or Master COMPACT, you can plug in your Roms/Eproms simply by inserting each one in a Viglen cartridge and plugging in whichever cartridge you want to use. The same Viglen cartridge can be used on all the micros mentioned and there is no need to switch the micro on and off between cartridge changes.

The Viglen cartridge system for the BBC micro consists of the cartridge cable assembly and socket, blanking off plates, 1 cartridge and cartridge storage rack. The cartridge socket when fitted protrudes from the rectangular slot on the left of the keyboard where the cartridges are subsequently inserted. It is simple to fit and requires no soldering.

The Viglen cartridge system for the Master and Master COMPACT simply plugs into your Master cartridge slot (or COMPACT expansion port) and accepts two Viglen cartridges. On the Master you can plug in up to two Viglen cartridge systems thus giving you access to 4 Viglen Cartridges simultaneously. The system comes complete with 2 cartridges and cartridge storage rack. On the Master you can also use Viglen cartridges which have 32 and 64K paged Roms inserted.

Stock Code	Description	Price inc. VAT
V560	Viglen Rom cartridge system for BBC	£12.95
V559	Viglen Rom cartridge system for BBC (low profile)	£12.95
V550	Viglen Rom cartridge system for Master	£14.95
V551	Viglen Rom cartridge system for COMPACT	£14.95
V561	Single Viglen cartridge	£3.45

Please add £2.50 P & P (£00.50 for single cartridge).

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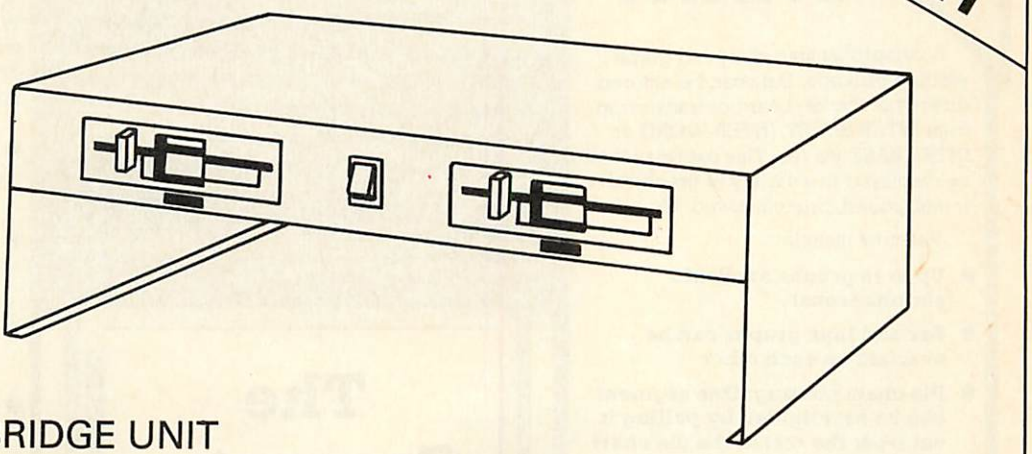
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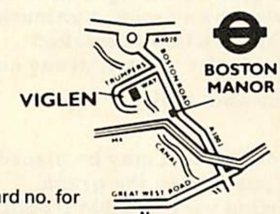
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Software for the Archimedes

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INTER-WORD, INTER-SHEET and INTER-CHART, like future packages already under development, are supplied in ROM form. Because the Archimedes has no standard sockets for additional ROMs, an additional 'ROM Podule' is required before they can be used.

Upgrades or exchanges available to existing owners. Please contact us for details.

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Wordwise Plus is supplied on disc for the Archimedes, so no ROM podule is required.

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Price: TBA. Anticipated availability: November 1987.

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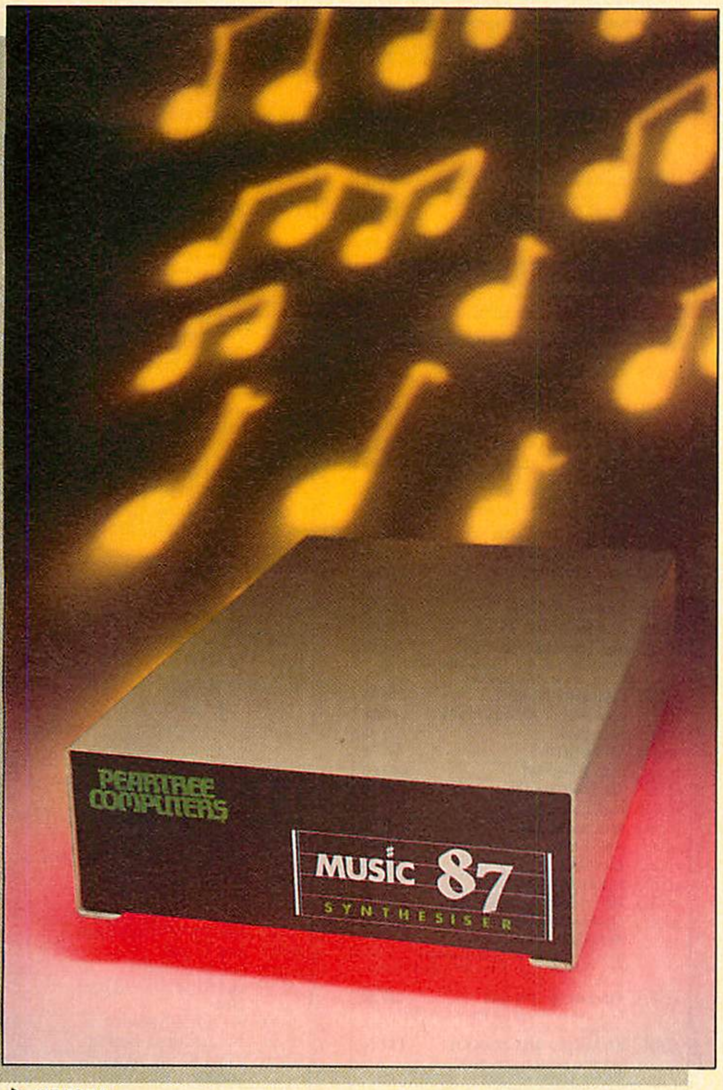
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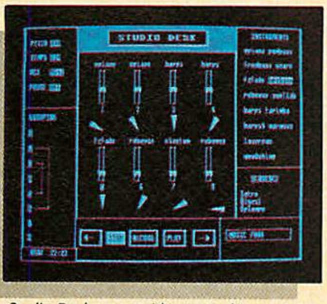
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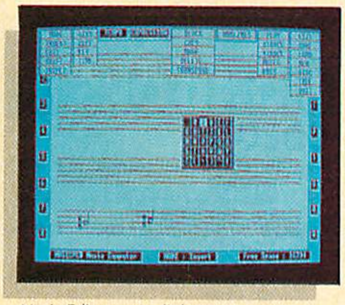
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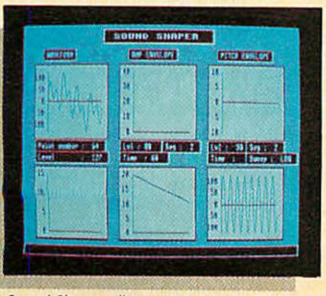
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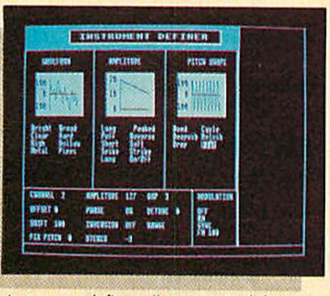
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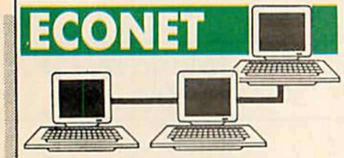
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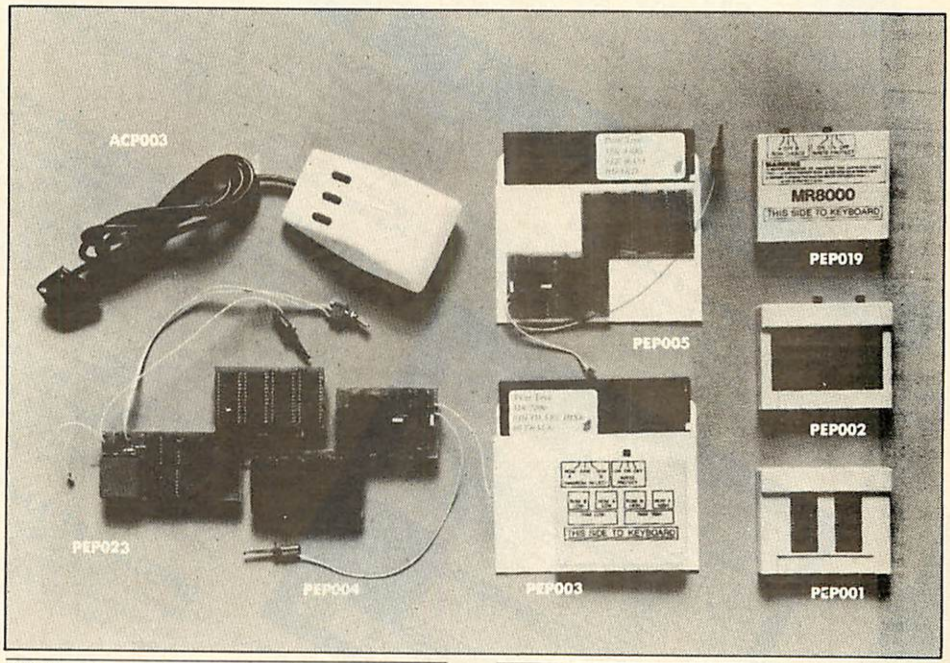
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THE 300 SERIES

The 300 Series, identified by its red function keys, consists of two models, ARCHIMEDES 305 with 0.5 Mbyte of RAM and ARCHIMEDES 310 with 1 Mbyte of RAM. These machines are the latest generation of British Broadcasting Corporation Micros. They offer, at low cost, all the basic features with expansion capabilities. Both machines have a 512 Kbyte ROM and a 1 Mbyte (unformatted) 3½" disc drive.

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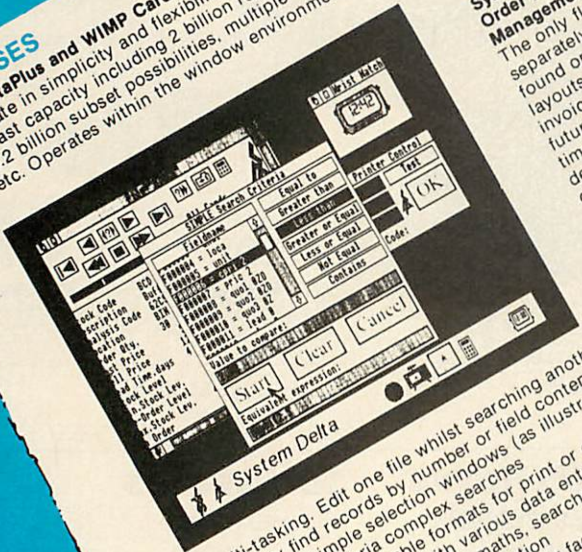
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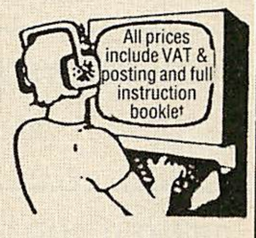
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Archive

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Articles in the October issue:

- File transfer on RS423
- Attaching a 5.25" drive
- C.C.'s ROM-Link packages
- Clares' Toolkit module
- Graphics demo programs
- Archie the Music Computer
- Structuring with BASIC V
- Technical notes on BASIC V

November issue includes:

- Using the WIMP manager
- Zarch is here!
- The RS423 saga continues!
- Using Wordwise Plus
- The *CONFIGURE command
- Using BBC ROM images
- Lots more Hints and Tips
- *Free User Guide Index*

December and following issues include:
BBC micro as an I/O podule, speed tests, using windows, using the operating system, using the debugger, sounds, ADFS for beginners, ARM assembly language, improved string handling, etc etc.

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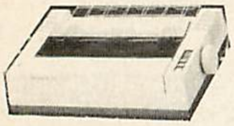
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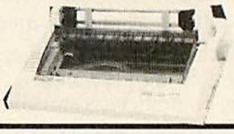
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LETTERS

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LEARNING TO PLAY

Sir, As a regular reader of *Acorn User*, I have taken a great interest in any program which has the word 'music' in its title and read reviews of such programs.

I have a number of music programs, including Island Logic's *The Music System*, but they are all designed to produce sounds from the computer.

My son, however, plays 'real' instruments (violin and trumpet) but is having difficulty in learning the theory of music, while my own knowledge is nil. What we both need is an educational program which is designed to teach musical theory, and I am enquiring whether you know of the existence of such a program.

With music departments in most of the secondary schools, there must surely be a market for something of this nature.

A L Southerden
Essex

Chris Drage and Nick Evans covered computer aided music teaching in the Education section of the August 1987 issue of *Acorn User*. Back issues are available, see page 135.

FINDING FAULT

Sir, An ADFS *FIND utility was published in Acorn Forum (*Acorn User*, September 1987). I submitted an upgrade allowing a wildcard character to be used *within* filenames too, and this was published in December's issue.

But there is a problem with both versions. This occurs with directory names exactly 10 characters long – a string of dots is displayed on the screen after the long directory name. To remedy this, add the changes below to either version of the program.

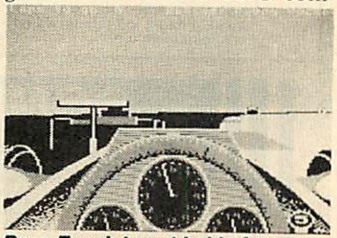
```
1810 LDY #0
1825 LDX #0
1845 TXA:PHA
1865 LDX #0
1935 INX
1940 CPX #&0A
2025 PLA:TAX
```

Of course the checksum will be wrong for the altered version. You can make the program ignore this by deleting the original line 190.

C P Armstrong
Wolverhampton

LOOKING FOR A RACE

Sir, Please could you tell me how I could purchase a cassette version of the racing simulation game *Revs* for the BBC computer. Where I live there are hardly any computer shops and of the few that do exist, none stock BBC micro software. If you could do so I would be very grateful.



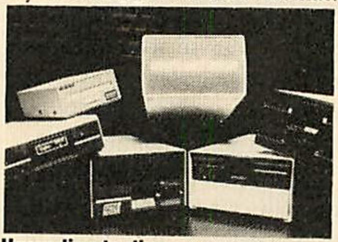
***Revs:* Tough to get hold of**

O J Crouch
Hampshire.

You should be able to order *Revs* on cassette directly from Superior Software. The cost is £12.95, and their address is Regent House, Skinner Lane, Leeds LS7 1AX. Telephone: (0532) 459453.

TAPE TO DISC TRANSFER

Sir, I have recently purchased a disc drive and want to upgrade my software to the new format.



Upgrading to disc

The programs I purchased are on tape.

I tried contacting the companies concerned but learnt that they no longer produce the software. I was hoping you could direct me to an agency or company who could upgrade the programs from cassette to 5.25-inch disc.

S L Wilson
Cheshire

There is no company we know of that will transfer your software from tape to disc, but there are a number of ways of doing this yourself.

For unprotected programs, Tessie Revivis' tape-to-disc programs published in *Acorn User* May 1986 should suffice. For protected programs, Vine Micros makes a range of 'Replay' units, small hardware add-ons that allow almost any program to be transferred. Vine Micros' address is Marshborough, Sandwich, Kent, CT13 0PG. Telephone: (0304) 812276.

LOCKING OUT SHIFT LOCK

Sir, I use a BBC B micro for wordprocessing and keep hitting the useless and infuriating Shift-Lock key by mistake. Can anyone advise a way to disable this key?

Nicholas Albery
London W11

The command *FX202,255,32 has the effect of switching off Shift Lock. What you need is an interrupt or event-driven routine that does the machine code equivalent of this every time a key is pressed while you are wordprocessing.

GETTING THE BACKUP

Sir, I own a Master 128 and would like to transfer Basic programs from DFS to ADFS. There is a utility to copy files to and from various filing systems, but how can I *BACKUP from DFS to ADFS?

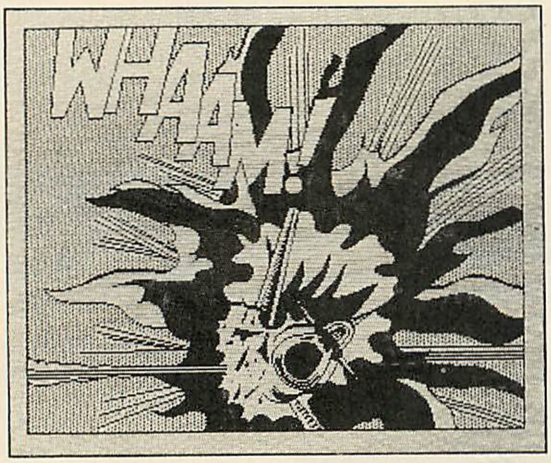
E Hollox
Norfolk

It isn't possible to backup directly from DFS to ADFS. However, there was a fast DFS to ADFS copier published in July's *Acorn User* on page 101 by John Knight which will make life a lot easier for you.

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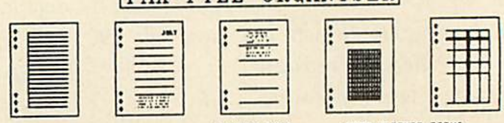
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STRING ALTERNATIVE

Sir, The problem of swapping string variables, without the use of a third 'dummy' variable was referred to in December's *Acorn User*. Two real or integer variables can be swapped easily.

This prompted me to find an alternative for strings. Here is one such solution:

```
a$="XXX"
b$="YYY"
a$=a$+b$
b$=LEFT$(a$,LEN(a$)-LEN(b$))
a$=RIGHT$(a$,LEN(a$)-LEN(b$))
```

I would be very interested to hear from readers who have come up with any other methods.

P F McDonald
South Humberside

300s DENIED MULTI-TASKING

Sir, I chose the Arc early and instantly, because as an electronics engineer I recognised its uniqueness in a field full of humdrum machinery. I was disappointed reading the 'Multi-tasking for Archimedes' news in your October issue. ARX in 1988 was all but promised in New Zealand. With competing machines supporting multi-tasking, and at lower cost, I feel that to deny 300-series owners a multi-tasking operating system is a real shame. Such operating systems need not be so hungry as to be impracticable on one megabyte machines. Too many software writers are treating the 300s as little more than glorified BBC Bs or Masters, and the ARX decision will do nothing to remove such misconceptions.

Finally, I intended continuing my four-year collection of your magazine, but could I put in a plea for more critical reviews? Readers rely heavily on these, yet some seem to border on whitewash, or indicate a rather shallow investigation by the reviewer.

Lloyd Blythen
New Zealand

With software producers being so much more ambitious with the Archimedes than with the Master, there is still a problem with memory on the A305. Sprites, high resolution with lots of colours, software in relocatable modules – they all require extra RAM. Because of this, there is the feeling that the 305 may become a latter-day model A. However, it is simple and reasonably priced to upgrade to the 310 specification. The extra RAM costs £102.35.

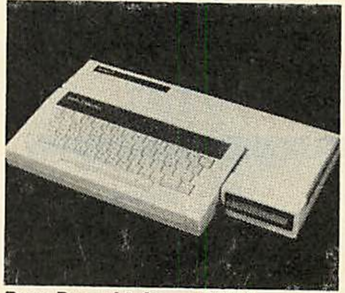
The recent *InterBase* review by Bruce Smith could hardly be considered a whitewash. If you want to comment on specific reviews, we're always glad to receive your letters. Readers views are often based on very extensive use of a package – and because of this are very valuable.

PASCAL USER

Sir, I have an Electron at home and have progressed gradually from the basic machine to having a Plus 1, Plus 4, 5.25-inch disc drive and a printer.

The programs and techniques that are described in the magazine are generally of great interest and I have typed many in. However, when programs don't run on the Electron, I tend not to read the article at all and miss out on the information. Would it be possible to include a note of why they aren't suitable, ie, lack of memory, mode 7 or whatever?

Having read so much about the problem of Basic, I decided to invest in a Pascal cartridge. But if Pascal is so much better, why are there no articles or programs using it in the computer press? In *AU* there is a comms page, business section, and education section, but no alternative language section.



Does Pascal take up RAM?

Some technical questions you might like to ponder: does fitting the Pascal cartridge use up RAM, and if so how could more memory be added? And are Acornsoft's extentions to the language practical when writing largish programes? How much memory does source code use once it has been compiled?

David Jamison
Belfast

With BBC Basic available on a growing range of machines, we will try to include more notes on compatibility for the Electron and other machines.

The Pascal cartridge can be added easily to the Electron, as it plugs into the Plus 1. It doesn't take up any memory – there is just as much available for Pascal programs as there is for Basic programs. Furthermore, a large Pascal program is usually more compact than an equivalent Basic program. Acorn's extensions to the Pascal standard make it easier to use graphics, sound and other features of the Acorn machines. The only problem is that your programs will become less portable – they can't be converted to run on non-Acorn machines as easily as if you hadn't used them.

CROWDED FILES

Sir, The *ViewStore* manual is reasonably well written, but is still inadequate for serious users. My database of 360k is about to exceed the space available on a double density disc. I would naturally think of dividing it into two, so that I can continue to search the more recent entries. However, there is no hint in the manual on how to divide a data file, although the extra notes supplied at request gave details on how to append another data file. Does anyone know how this is done?

Is there any way of deleting a run of records, other than pressing the Delete key for each one? And is there no quick way of determing how many records are on file, other than making a Select file, when it is reported incidentally? Finally, is there any way of speeding up the inordinately long search time on the BBC B for files as long as mine?

R L Symonds
Kent

There are several things you should think of doing with your large database. First, changing to ADFS allows the file to grow up to 640k long.

You can divide a database by using the Select utility to choose which records to put in a sub-file. Of course, you can choose the most recent if you have a date field. Then use the Convert utility with the selection file, to make up a new database – using the * wildcard when it asks which fields to convert will duplicate the record structure of the old database in the new one.

A hard disc speeds up searching, but at a price – hard discs were reviewed in *Acorn User*, September 1987.

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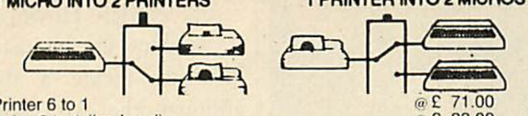
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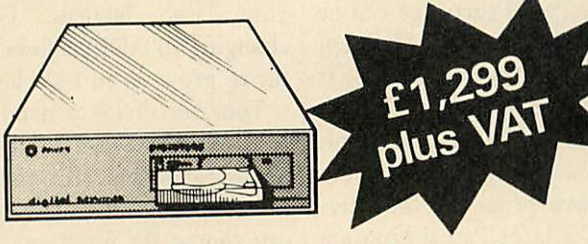
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CONCEPTS SLAMMED

Sir, Since I started computing with my good old BBC B, I have always purchased Computer Concepts' products.

When the *Inter* family of programs were announced, they appeared to offer most of the features I required, and so as each program appeared, it was purchased. Each one justified my confidence in Computer Concepts, the promised features were all there, and the manuals were readable and easy to follow.

Directly the adverts for *InterBase* appeared, I placed my order, expecting the same quality associated with other Computer Concepts ROMs. I then waited six or eight months until the chip was actually available. When it was, my faith in Computer Concepts' products was shattered. The card index is useless and as to the manual, it was the first time I have taken the trouble to write to a computer company about the quality of their product.

I am now left wondering how much extra over and above the advertised price faithful supporters of Computer Concepts like me are going to be asked to pay for features that we could reasonable expect to have been supplied with the original package ie, a useful card index program and a manual that does not require a degree in computer science to understand it.

R S Scott
Herts

Rob Pickering of Computer Concepts replies: 'We are aware of the criticisms levelled at *InterBase* by some users, and Computer Concepts is doing its best to rectify the problems. In particular, the manual is being rewritten to include more step-by-step examples and more information on the built-in programming language. There'll also be extra material on the ROM-link system. When this is ready, it will be available to registered *InterBase* users as a free upgrade. This will also apply to a revised ROM, when the bugs have been fixed.'

TOO LITTLE MEMORY

Sir, I own a Master 128 and using *ViewSheet* I find I'm running out of memory. Yet I still have four fifths of the data left to enter.

A teacher by trade, I am using the spreadsheet to process and then combine five sets of marks for 100 pupils. Each set of marks has its mean and standard deviation evaluated and then *each* original mark is adjusted using a formula, so as to fit a new mean and standard deviation range.

Entering just one-third of the marks for the first test leaves me with just 6000 bytes.

Why isn't more of the vaunted 128k of RAM available? And is there a way I could use more memory?

Do I *have* to extend my Master with a second processor, extra RAM, or whatever?

B L McDermott
Derbyshire

Using *ViewSheet* on a Master 128 gives you about 28k of memory free in a shadow mode. *ViewSheet* doesn't have the ability to use any of the other RAM in the machine. Even on a turbo co-processor, it can't use more than 30k for storing data. The only way to run spreadsheets larger than *ViewSheet* can accommodate is to upgrade to an MS-DOS 512 co-processor, and use a spreadsheet such as *Logistix*.

WAYS WITH WORDS

Sir, For people like me who need the computer for wordprocessing – nothing fancy – I can't understand why Acorn has been unable to find that extra bit of memory for the BBC B at a realistic price and without the necessity of all these fiddly boards.

I use my three-year-old BBC micro to write novels in the region of 60,000 words long and need a reliable solution which is, above all, simple.

I understand that the Master gives little more available memory than the BBC B. Just 5000 words plus the necessary operating space is all I ask, but without complications and with the capability of using my present files in *Wordwise Plus*.

One point I also want to make which wasn't brought up in the June 1987 issue on publishing, is that you must use a daisy-wheel. Dot-matrix output is fine for short pieces, but the poor publisher's eyes would be going dotty after a 60,000 word manuscript.

Gwen Holder
Hants

If you have *Wordwise* and a model B and want more memory, the only solution is to add a 6502 second processor (about £200) and use *Hi-Wordwise Plus*, which comes on disc. This will give you about 44k of memory (about 7000 words) rather than 24k (4000 words).

***View* users with a model B who edit in 80-column mode 3 can go for the Aries B32 Shadow RAM board (about £90 from Watford) which improves memory space from 1500 to 4500 words.**

PRINTER DRIVER HELP

Sir, I was very impressed with Martin Phillips' very useful program for generating a printer driver for *View*. At last the Acornsoft driver can be dispensed with, and documents can be easily produced without having to fight the driver.

I have added a few extra lines to the program to assist those users who, like myself, do not use the wordprocessor continually and who could do with an enhanced *aide memoire*. My new lines are:

```
385 name$=STRING$(7,
" ")
965 PRINT "ASCII Po
und = ";?&94C;" Filena
me is ";name$
1365 PROCshow
```

The modifications allow the pound character and the driver's filename to be shown on the screen, together with a reminder of the highlight code to use. The screen can be printed out and a copy stuck to the side of your monitor as a reminder.

D R Piercy
Dorset

```
        View Printer Driver Generator
  v       Use these codes with HT 2 = 141
             ON             OFF
@/P   27,64          0              RESET
A/Q   27,120,1       27,120,0       NLQ
B/R   27,71          27,72          DBLE STRIKE
C/S   15             18             COMPRESSED
D/T   27,69          27,70          EMPHASISED
E/U   27,45,1        27,45,0        UNDERLINE
F/V   27,77          27,80          ELITE
G/W   27,87,1        27,87,0        DBLE WIDTH
H/X   27,104         27,117         DOUBLE HT
I/Y   27,52          27,53          ITALICS
J/Z   27,112,1       27,112,0       PROPORTIONL
K/[   27,82,3        27,82,0        UK>USA SET
L/\   27,83,0        27,84          SUPERSCRIPT
M/]   27,83,1        27,84          SUBSCRIPT
ASCII Pound = 35   Filename is DRIVER1
```

D R Piercy's modified printer driver program

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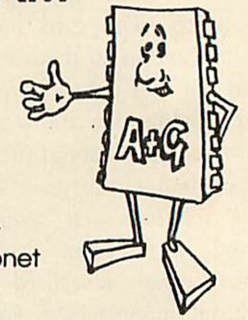
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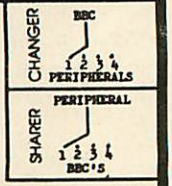
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HINTS & TIPS

GETTING THE BOOT

How do you go about using !BOOT files? We give you examples of menu programs and start-up discs plus a printer compatibility table

Martin Phillips

Almost all commercial disc programs load automatically when you press the Shift and Break keys together. This useful idea, called 'booting' a disc, is built into the disc filing system (DFS) of all current Acorn computers. However, booting can only happen if the disc has a !BOOT file saved on it, and the DFS is told it's there. When a Shift-Break is performed, the DFS looks for a file on the disc, which must be called '!BOOT'. Because the DFS does not know whether to *RUN, *LOAD or *EXEC the file, it also looks at the 'option' set on the disc by the *OPT command.

The *OPT command is used for a variety of tasks, and can be followed by two parameters (numbers). The first parameter selects which option and the second sets the option's value. To control the auto-boot option on a disc, *OPT 4 is used. This needs to be followed by another number to set the way the auto-boot command works:

*OPT 4,0 disable auto-boot
*OPT 4,1 *LOAD !BOOT files.
*OPT 4,2 *RUN !BOOT file
*OPT 4,3 *EXEC !BOOT file

These options are the same for DFS and ADFS. The most used options are *OPT 4,2 and *OPT 4,3.

I have yet to find a sensible use for the * OPT 4,1 (*LOAD option). The chosen option can be seen on a disc by cataloguing a disc (*CAT) and looking at the information printed at the top right of the catalogue text.

The !BOOT file needs to be either a machine code program which can be run directly, or needs to be an exec file. Exec files are very useful as they allow a variety of Basic and operating system calls to be made to set up your micro. The *BUILD command in the DFS allows exec files to be created.

To see how a disc can be made to boot up when Shift-Break is pressed, first take a blank formatted disc – do not use a disc with important programs on it at this stage. Keep this disc in the drive until the task is finished. First, you must type in the following simple program:

```
10 REM This is the me
nu program
20 CLS
30 PRINT TAB(14,1)"ME
NU PROGRAM"
40 PRINT TAB(5,5)"1.
Load program 1"
50 PRINT TAB(5,7)"2.
Load program 2"
60 PRINT TAB(5,9)"3.
Load program 3"
```

Save this dummy program (it actually does nothing as it stands) as MENU. This will give a program that can be chained by the exec file.

Now type the following:

```
*BUILD !BOOT
```

and the computer will print a line number. Enter the following line after the line number which has been printed:

```
CHAIN "MENU"
```

and now press Escape. The !BOOT file will be saved to disc. Longer ones can be made by simply entering more lines before pressing Escape. Finally, all that needs to be done is to set the disc option to exec the !BOOT file. Type:

```
*OPT 4,3
```

Now press Shift-Break and if all is well the disc should boot up and run the dummy menu program.

Using this technique, the !BOOT file can be made to load a variety of programs or menus. For further ideas on how !BOOT files can be used, see the item on preparing a *View* start-up disc on page 41. See also listing 2 on the yellow pages which is a simple but effective menu program to enable a variety of programs to be chained, loaded or run from disc.

An annoying feature of the *BUILD command is that it is difficult to edit files. To overcome this, Master owners can use

BOX 1: BOOTING A DISC

- Hold down the Shift key.
- Press the Break key once and release.
- Release Shift.

If this doesn't work, catalogue the disc to check there is a !BOOT file, and that the option on the top right is set to 1, 2 or 3. If these aren't present, the disc won't boot up. If they are present, try again. You should see the disc light go on as the file is loaded.

BOX 2: !BOOT FILES

When you start work on your micro, jot down on a piece of paper everything you type before you actually do any work. Do this a second time, and compare your notes. You'll often find that the two lists are the same, because you always set up the machine the same way.

All the commands you type in every time can be put in the !BOOT file. Use a wordprocessor to type the commands in, on separate lines. Save the file of commands, calling it '!BOOT', and set the *OPT 4,3 option. Now all the commands will be executed automatically when you 'boot' the disc.

```
*TV 0,1
*| turns screen jitte
r off
*FX 202,48
*| turns caps lock of
f
*FX 12,5
*| speeds up auto-rep
eat
*KEY0 Redwood Publish
ing Ltd
*SHADOW
MODE 3
*| HELLO MARTIN
*|
*CAT
*|
```

Above are some of the commands you might want to use.

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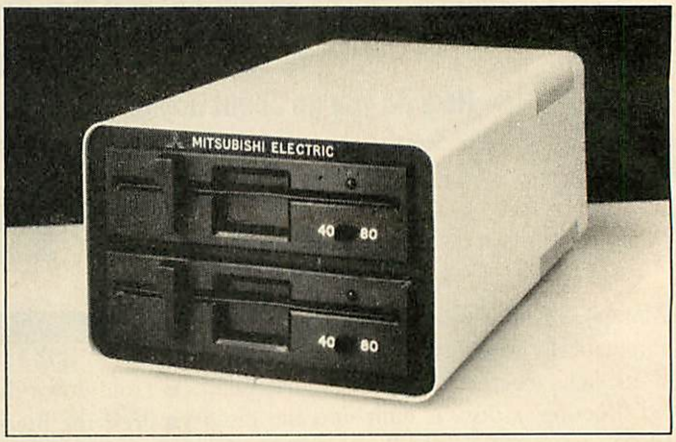
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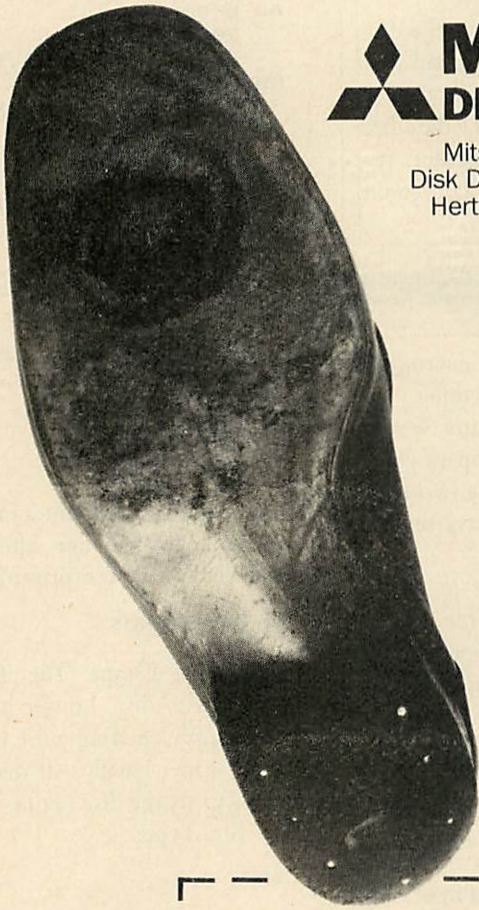
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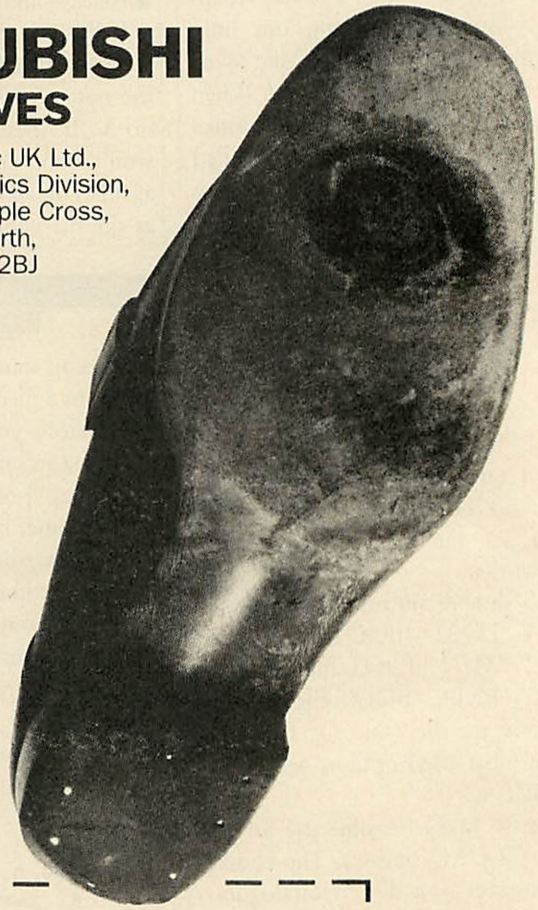
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the editor supplied with the computer; *Wordwise* and *View* could be used too. Using either *Edit* or a wordprocessor, no line numbers should be inserted. Use f3 (save file) to save the file from the editor but remember you should call it !BOOT. Save as normal from *Wordwise* and *View* with the filename !BOOT.

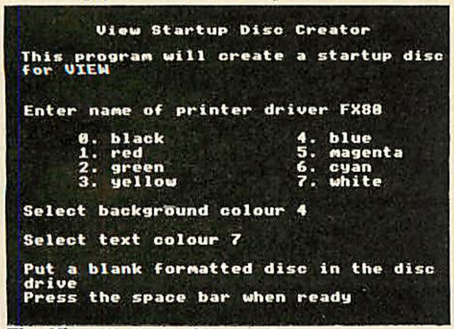
Once you've got a standard boot file, it can be copied from disc to disc like any other file, although the *OPT command must be used on each new disc. You can always check what's in a !BOOT file of this sort by using the command

```
*TYPE !BOOT
```

VIEW START-UP DISC

An annoying feature of *View* is that each time it is started up, several commands have to be typed in to set it up the way you want. The mode must be selected, then the screen colours altered to those you prefer, and a printer driver loaded.

Listing 1 in the yellow pages will quickly and simply create working *View* discs that



The *View* start-up disc creator

can be booted to load and set up *View* the way you want. The set-up program first asks for the name of a printer driver, which must be on the same disc as the set-up program. Next the screen colours are selected, and a message asks for a blank formatted disc to be put in the drive. A !BOOT file is created on this blank disc using *SPOOL and the exec option is set. The screen mode is changed first to three and then to 131. Although this seems a mistake, it is a simple but effective way of catering for shadow memory if it is present. When this !BOOT file is run, the screen will be changed to mode 3, and mode 131. If mode 131 does not exist a 'Mistake' message will be flashed on screen, but the !BOOT file ignores this.

View will be loaded by the *WORD command in the !BOOT file, followed by the printer driver. Next comes a neat but simple use for the spooled VDU commands. (See earlier Hints & Tips for details.) This is by far the easiest way of putting the colour changes into a !BOOT file, but it will also make the changes as the set-up program runs. Other instructions can be included at this point in the program, before the boot file is closed. Finally, the actual printer driver is saved onto the new start-up disc. The program ends by giving the option of creating more discs, so several can be set up at one go.

There are a couple of simple loops to check for particular key presses. These are frequently required, and are worth emphasising here. The first checks for the space bar being pressed:

```
REPEAT UNTIL GET=32
```

This loop will keep on repeating until the value given by the GET statement (which waits for a key to be pressed) is 32 – the ASCII value for a space character. The other loop checks for 'Y' or 'N':

```
REPEAT
g$=CHR$(GET AND 95)
UNTIL INSTR("YN",g$)<>0
```

This also checks for a lower case letter input and converts it to upper case, so typing 'n' makes g$ 'N'

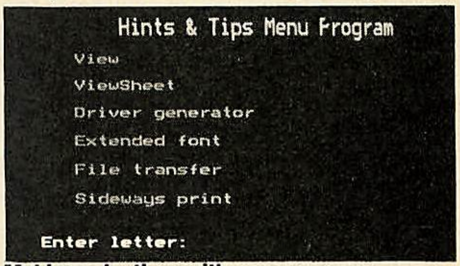
To use the start-up disc which listing 1 creates, simply insert one in the disc drive and press Shift-Break. If you've never got the hang of this see box 1 on page 43. It will then enter *View*. There will still be room for up to 29 other files to be saved on a normal disc, or many more on an ADFS disc.

This program can easily be adapted to produce start-up discs for *ViewSheet* and *ViewStore* too, but you might want a more general approach. This is described in box 2 on page 39.

A MENU PROGRAM

A neat way of tidying up all those odd programs on a disc is to have a menu program which is booted in. Listing 2 on the yellow pages will CHAIN, *LOAD, *RUN or *SRLOAD a program or file. It will work on both DFS and ADFS, and space has been allowed in the filename for directories. Up to 15 programs can be described on the screen, with the option of moving to a new screenful of descriptions.

The program has a series of DATA statements which are inserted as the programs are put on the disc. The first DATA statement is the title of the disc which can be up to 35 characters long. Longer titles



Making selections with menu program

will be truncated. The next DATA statements, one for each program, give the filename, how the program is to be loaded, and the file description. The file type is a single letter which indicates how the file is to be loaded or run: C CHAINs a Basic program, L *LOADs a program, R *RUNs a machine code program, and S loads a ROM image into sideways RAM.

'S' will prompt the program to ask which RAM bank is to be used. The filename can include directories or drive numbers. To CHAIN a Basic program called 'PROG1' from directory D on drive two, use the following statement.

```
DATA :2.D.PROG1,C,Mar
tin's super utility
```

The final DATA statement must be three asterisks to mark the end of the data. As the program stands, up to 64 files can be included, which is sufficient for a double-sided DFS disc. Changing X% in PROCunit, this can be increased for Advanced Disc Filing System users.

The program works by first dimensioning space for three arrays: file$(), the filenames; type$(), the execution types, and discs(), the file description to be displayed. PROCdouble prints the title in double height. For convenience, R$, G$, Y$ and C$ are included here; they are the teletext codes for the screen colours.

PROCread reads all the data into the arrays. PROCselect displays the descriptions on the screen, and the prompts for a program to be loaded. PROCoscli is included so the program runs with Basic 1.

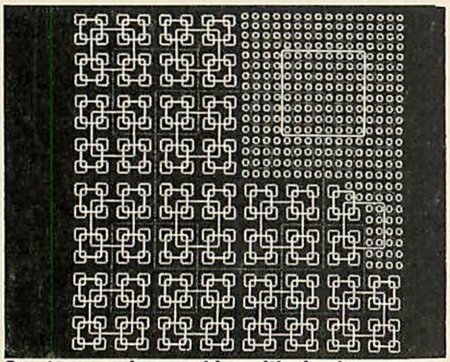
Electron owners will need to make these changes in PROCdouble:

```
DEF PROCdouble(A$)
R$=""
G$=""
Y$=""
C$=""
x%=(38-LEN(A$))/2
PRINT TAB(x%,0)A$
ENDPROC
```

RECURSIVE SQUARES

The next few Hints & Tips will include a short program for interest and for those readers who enjoy playing with programs. Listing 3 on the yellow pages draws patterns of coloured squares using recursion, a technique by which a procedure can call itself again and again. As parameters can be passed during recursion, impressive effects can be achieved by a simple program.

The program works in mode 1 with the text and graphics cursors joined with VDU 5. The main procedure, PROCrun, contains a loop which changes one of the logical colours to any one of the eight possible actual colours. Then each time this



Create recursive graphics with simple programs

procedure is entered a different effect is achieved. Next the drawing colour is randomly chosen, again to provide variation. GCOL 3 is used so that when a line is drawn which crosses another line, a different colour is produced at the intersection. It is this feature which makes the pattern fascinating. Then PROCsquare is called up, which draws a square on the screen about the graphics origin. This is set using the VDU 29 command. The three parameters give the X and Y co-ordinates of the centre of the square, and the 'offset', S%. The offset shifts the position of the new square, and also reduce its size. The procedure calls itself up four times, once at each corner of the square. Because recursion is used, this process is repeated until S% becomes less than M%. Thus a series of squares are drawn, each half the size of the previous set.

On the Archimedes, the better colour modes can provide a more varied display. Try changing the following lines:

```
  60 MODE 13
  160 VDU 19,RND(63),RND
(63),0,0,0
  170 GCOL 3,RND(63)
```

SOME QUICKIES

■ Backing up several discs at one time? Use a function key to program the commands as follows:

```
    *KEY0 *ENABLE|M *BACK
 UP 0 0|M
```

■ When typing in a listing which uses such things as VDU 5 and *FX 4,1, it is impossible to list the program after it has run without resetting the commands or pressing Break and then typing OLD. The latter can be dangerous; it's better to program a function key to reset the VDU and FX commands and list the program:

```
    *KEY0 MODE7|M *FX4|M
 |N LIST|M
```

This is what the definition does:

*KEY0	Use function key 0
MODE7|M	Clear the VDU 5 and clear the screen,
*FX4|M	Return the cursor keys to normal editing.
|N	Put page mode on.
LIST|M	List the program.

■ It is often useful to save a program at regular intervals as it is being created. A simple way is to program a function key:

```
*KEY0 SAVE"myprog"|M
```

■ To print out a listing, you commonly type LIST followed by CTRL-B. This switches on the printer so that everything displayed on the screen is also printed. At the end of the listing, you press CTRL-C to switch off the printer. But this gives an extra '>' character at the bottom of the listing. To get rid of this, you can type LIST followed by CTRL-B, Return, CTRL-A, then Delete, then CTRL-C.

CASSETTE LOADING ERRORS

No doubt readers will have come across the 'Header?', 'Data?' or 'Block?' messages appearing on the screen when trying to load a program from cassette. Unlike some error messages, it is not clear what these are trying to indicate. To understand what they mean, it is necessary to know how the computer stores programs on tape.

Imagine a book of short stories. This is equivalent to a tape with several programs stored on it. For convenience, the book is split into small parts called pages. Each page is numbered. A program is also split up into small parts called blocks. Each block is numbered. (The computer counts in hexadecimal, base 16, rather than base 10.) Play a tape without the computer lead plugged in and listen to the sound. There is a single high-pitched tone called the leader followed by a series of buzzing noises, each of which lasts about three seconds. Each separate buzzing noise is a block. The computer keeps a note of the number of the block it has just read and will give a 'Block?' message if the next block it reads from the tape is not the one it was expecting to see.

At the top of a page in a book you often find the name of the story printed as well as the page number. The computer always saves the title and block number at the start of each block together with a checksum. This information is contained in what is called the header. If the computer is unable to read the header correctly then the 'Header?' message is printed.

Below the title and page number in a book comes part of the story itself. It is written in words and sentences. This is equivalent to the commands, statements and lines that make up a program and is called data. Once the computer has read a block of data it uses the checksum given in the header to make sure it has read the data correctly. If not then the 'Data?' message appears followed by the message 'Rewind tape'. You only need to rewind to the start of that particular block and not to the start of the program.

PRINTER COMPATIBILITY

Epson printer compatibility is an important issue, as many software packages assume you're using one particular printer – usually the ubiquitous Epson FX80 is considered the 'standard'.

Most common printers claim some compatibility with the standard Epson 'ESC/P' control codes. The first printer compatibility tables appeared in *Acorn User* in August and September 1986, with data on 18 printers. A further eight printers are listed here, many of them new models released since the original tables were published.

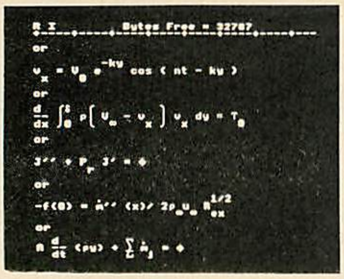
Not all the codes are listed – most printers have a wider selection, but those given are generally the most useful. The table shows the high degree of compatibility of the Kaga and Panasonic models with the Epson 'standard'.

PRINTER COMPATIBILITY TABLE

Codes	Effects	Epson FX80/800	Epson LX80 /86/800	Epson LQ800	Epson GQ3500	Kaga 815/ Canon A50	HP Think-Jet	Integrex Colourjet	Panasonic KX-P1083
8	Backspace	■	■	■	■	■	■		■
12	Form feed (new page)	■	■	■	■	■	■	■	■
13	Carriage Return	■	■	■	■	■	■	■	■
14	Double width (temp)	■	■	■	■	■	■	■	■
15	Condensed	■	■	■		■	■	27,123	■
18	Cancel condensed	■	■	■		■	■	27,124	■
20	Cancel double width	■	■	■	■	■	■	■	■
27,38	Define downloadable char	■	■	■		■			■
27,45,1	Underline	■	■	■	■	■	■	27,45	■
27,45,0	Cancel underline	■	■	■	■	■	■	27,45	■
27,48	1/8-inch line spacing	■	■	■	■	■	■	■	■
27,49	7/72-inch line spacing	■	■			■	■		■
27,50	1/6-inch line spacing	■	■	■	■	■	■	■	■
27,52	Italics	■	■	■	■	■		27,125	■
27,53	Cancel italics	■	■	■	■	■		27,126	■
27,64	Reset printer	■	■	■	■	■	■	31	■
27,69	Emphasised (bold)	■	■	■	■	■	■		■
27,70	Cancel emphasised	■	■	■	■	■	■		■
27,71	Double-strike (bold)	■	■	■	■	■		27,62	■
27,72	Cancel double-strike	■	■	■	■	■		27,62	■
27,77	Elite font	■	■	■		■			■
27,80	Pica font	■	■	■		■			■
27,82,3	English character set	■	■	■	■	■		27,82,2	■
27,82,0	US character set	■	■	■	■	■		27,82,1	■
27,83,0	Superscript	■	■	■	■	■			■
27,84	Cancel superscript	■	■	■	■	■			■
27,83,1	Subscript	■	■	■	■	■			■
27,84	Cancel subscript	■	■	■	■	■			■
27,87,1	Double width (pera)	■	■	■		■			■
27,87,0	Cancel double width	■	■	■		■			■
27,106,n	Reverse feed n/216*inches					■			■
27,112,1	Proportional spacing	■		■	■	■			■
27,112,0	Cancel proportional spacing	■		■	■	■			■
27,119,1	Double height	■[1]			■			27,46	
27,119,0	Cancel double height	■[1]			■			27,61	
27,120,1	NLQ	■[1]	■	■	[2]	■			■
27,120,0	Cancel NLQ	■[1]	■	■		■			■
27,65,n	n/72-inch line spacing	■	■	■		■	■		■
27,75	Normal density graphics	■	■	■		■	■	■	■
27,76	Dual density graphics	■	■	■		■	■		■
27,89	Double density graphics	■	■	■		■			■
27,90	Quad density graphics	■	■	■		■			■
27,42,5	Proportional graphics	■	■	■		■			■

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FIRST BYTE

PERIPHERAL INTERESTS

So you want to add something to your new micro, or perhaps you'd like a little gift for a faithful friend? Read on

Tessie Revivis

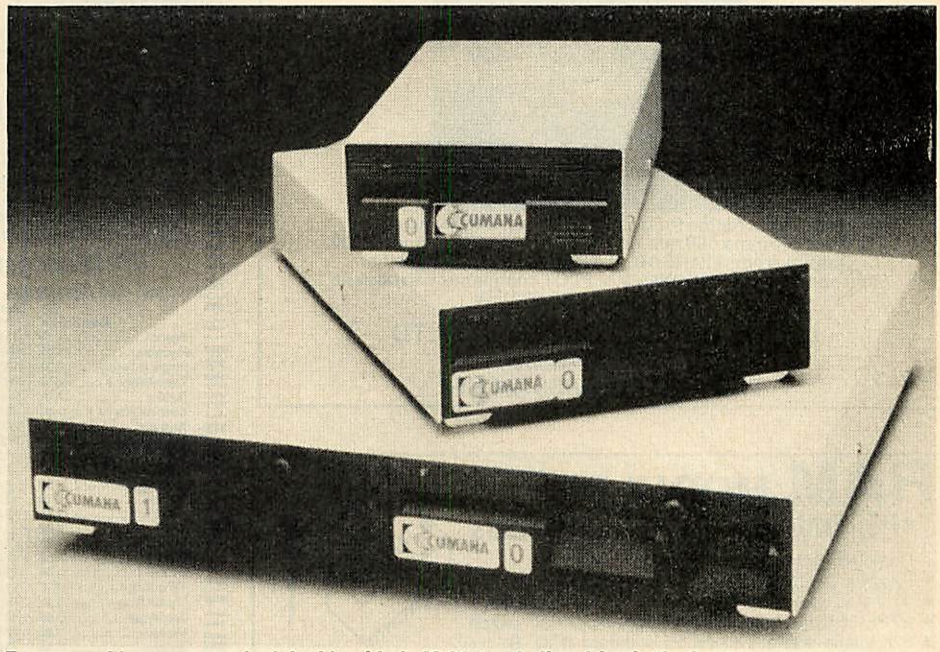
If you were lucky enough to receive a new computer for Christmas, you might well be wondering what to buy in the way of peripherals or software. Or perhaps you simply want to brush the dust off the case of your Beeb after the festivities and relax in front of a tranquil prompt!

Because of the popularity of the Acorn micros, a healthy third-party product market has flourished. There's a wide range of products and among them are some outstanding and well-priced ones. Of course, what you should spend your money on will depend on what you want to use your computer for.

Choosing peripherals is fraught with problems, so here I'll try to give you some general hints and tips to guide you through the jungle. Armed with this knowledge, you should be able to read reviews – most important – and sift through the advertisements in the magazine and sort out a final selection. Then it's vitally important to go and see what you are planning to purchase, to ensure that it is exactly what you want. Then, and only then, should you part with your cash. If you can't get to an Acorn dealer, then it will be more difficult. Keep a look out for computer shows in your area – you'll often get discounts on peripherals at these shows, and as a last resort, rely on the reviews which appear in *Acorn User*.

Disc drives

Fast and easy access to your programs and files is the key to efficient and trouble-free computing. I can remember the days when I was limited to storing wordprocessor files created on an Acorn Atom, and later a model A BBC micro, on a cassette tape. This storage method can be unreliable, but more importantly it is infuriatingly slow. You may wonder why I bring the subject of tapes up here – the answer is quite simple. I was amazed to find out after talking to various users at the last *Acorn User* Show that lots of people still use them.



For general home use, a dual double-sided, 40/80-track disc drive is the best

Master Compact owners will already be aware of the virtues of the disc drive, as one is included with the micro. This is a 3.5-inch drive, and the Compact uses the Advanced Disc Filing System, ADFS for short. The ADFS is also available on the Master 128, along with Acorn's more traditional Disc Filing System (DFS). I don't intend to go into the pros and cons of each here, other than to say that with ADFS the number of files that you can store on a disc is limited only by the amount of space available on it – 640k per disc. DFS discs are limited to a maximum of 31 files per disc, subject to available space.

The ideal disc drive that should be considered for Master 128 users, and Beeb users in general, is a twin, double-sided drive which is 40/80-track switchable.

DFS discs can be either 40- or 80-track. The difference between the two is that an 80-track disc can hold 200k of data on one surface, exactly twice as much as a 40-track disc. By having a 40/80-track switchable drive, you can read both disc formats. Discs can also be single and double-sided. A single-sided, 80-track disc can hold 200k of data, and a double-sided disc 400k. Double sided 40-track discs hold half as much. AA switchable drive allows you to select either format at the flick of a switch.

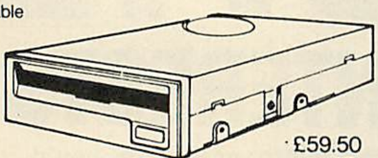
In the past, discs for BBC micro users have been of the 5.25-inch variety, but the Compact uses the smaller and more robust 3.5-inch discs. So choosing between the two can cause headaches. While a growing range of software is available on 3.5-inch, the majority is still produced on 5.25-inch discs. This fact should influence you. Some manufacturers produce combined drives with a 3.5- and 5.25-inch drive in a single unit, and they are particularly useful for transferring files. But for general home use, a normal dual drive is better.

For Master Compact users, it is definitely worth considering installing a second 3.5-

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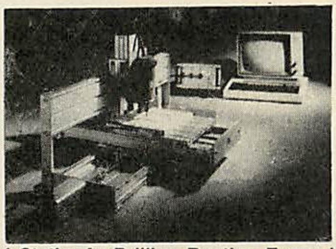
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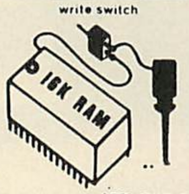
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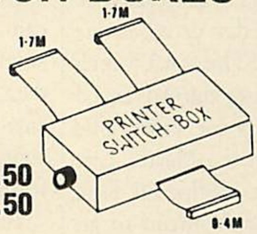


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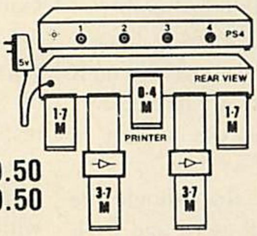
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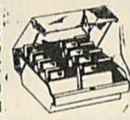


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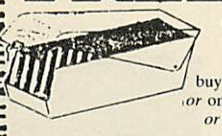


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inch drive, particularly if you want to run complex tasks like database applications. With a second drive, backing up files becomes much easier too.

Hard discs have become more popular over the past 12 months, and now they can cost as 'little' as £500 or so. If you have a Master 128 or an original BBC model B, they are well worth considering, as you can virtually do away with normal floppy discs. However, be wary of purchasing any hard disc that has a capacity of less than 20 megabytes. Many five megabyte drives are available, but they should be avoided because they soon become full. If you are using an ADFS drive then each disc has a capacity of 640k, so you need just nine discs to pass the five megabyte barrier.

Monitors

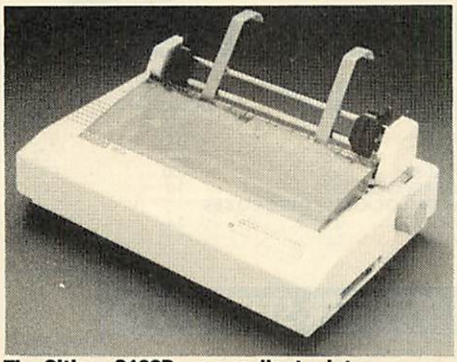
Choosing a monitor is difficult because the choice is so subjective – what appears good to me may not appear so to you. For instance, some people swear by green screen monitors (green text on a black background) for wordprocessing, whereas I simply won't use anything but a colour monitor for anything! Others, including several in the *Acorn User* office, prefer the amber monitors which produce a more restful, orange text, although they are a few pounds more expensive than their green screen equivalents. When choosing a monitor, look at a wide and varied range. If you use your micro as a wordprocessor, then try your program on each and make notes. If you play games then test each with a game. An acid test for any monitor is simply to turn it off! Does the image persist on the screen, ie, can you still see what was on the screen straight after turning it off? If so then forget it – this sort of 'persistence' will become annoying, especially as you scroll through a program or text.

Acorn User December 1987 carried a review of the latest colour and monochrome monitors. There was also a program on the December monthly disc to help test monitors for annoying persistence, resolution and geometric distortion.

Printers

The choice of printers is really quite amazing, but for the beginner there are only two basic types of printer at affordable prices, dot-matrix and daisy-wheel. The dot-matrix type is the most popular, and for every day use, it will serve you well. There are two types, nine-pin and 24-pin. The latter is a more recent innovation and because there are more pins to push the ribbon against the paper, the resulting print-out is more refined. That said, they are considerably more expensive than the normal nine-pin dot-matrix printers.

Daisy-wheel printers use a disc with letters on spokes – the head rotates to the correct letter and a hammer hits the spoke against the ribbon. They tend to be slow in operation, but are of particular use in an office environment where typewriter quality is required. However, most dot-matrix printers these days also have a near letter quality (NLQ) or letter quality (LQ) mode, where the type quality is approaching that offered by a daisy-wheel. And daisywheel printers cannot be used to print dumps showing graphics.



The Citizen C120P, an excellent printer

For home use then, a dot-matrix printer is usually the best choice. When selecting one, try to ensure that it is really Epson-compatible. The Epson FX-80 printer has become the *de facto* standard among printers worldwide and virtually all programs are written to accommodate this. Having an Epson-compatible printer does not mean that you have to purchase an Epson printer, just one that is compatible. But there are degrees of compatibility, as a glance at the tables of printer control codes in August and September 1986 and on page 42 of this issue shows. The Citizen C120D and Panasonic PX1083 printers are excellent budget-priced printers for around £200. Both produce good quality printing.

Application programs

Both the Master 128 and Compact come with the *View* wordprocessor, and the Master 128 is bundled with the *ViewSheet* spreadsheet too. As a wordprocessor for the BBC micros, *View* is second to none. It does have its idiosyncrasies though, and unless you are willing to put some time and effort into learning it, there can be difficulties. Computer Concepts' *Wordwise* has become one of the biggest selling ROMs for the BBC micro and is very simple to use. It does suffer from the disadvantage of a 40-column mode 7 screen however. *Wordwise Plus* has, to some extent, been superceded by *InterWord* which is also easy to use – providing you don't want to vary the line spacing within a document. If you can't get the hang of *View*, take a look at both of these products, but do remember that you have already bought a wordprocessor bundled in with your machine.

The second most popular type of application program is probably a database and there are several to choose from. *ViewStore* is, in my opinion, the best piece of ROM software written for the Acorn market. But even more so than its *View* counterpart, it is very difficult to learn unless you are willing to spend a week or two working through the examples and reference books.

Second to *ViewStore* as a database is probably *System Delta* from Minerva Systems, which is supplied with a built-in card index application which mimics a standard card index address system.

For cost analysis and money management, a spreadsheet is useful. As mentioned before, *ViewSheet* is included in the Master 128, and if you aare using *View* or *ViewStore* it would make sense to buy this product to complete the range. However, *InterSheet* from Computer Concepts is possibly the best spreadsheet on sale for the BBC range, and BBC Soft's *Ultracalc* is also worth considering for scientific tasks.

If you find that you have a minor need for all three types of product – wordprocessor, spreadsheet and database – then *View Professional* integrates all three applications into one and is highly recommended, but it is more expensive than any one of the other packages.

Other software

An absolute must for any disc-based BBC micro is *ADT* from Advanced Computer Products. This is a special ROM that allows you to recover data from damaged discs. Happily, discs are much more reliable than cassettes, and this doesn't happen very often. When it does, you'll be thankful for a good disc toolkit.

There's a round up of the first few purchases that any new micro owner should think about. A disc drive, printer, monitor, and some good application software will help you get the most out of your new machine or more from your old one.

Check out the Panasonic printer reviews on page 145 of this issue

Computers by Post

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DAISYSTEP	2000 MS	£2.90	£2.40	£2.20
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	LX80/LX86	£2.50	£2.10	£1.90
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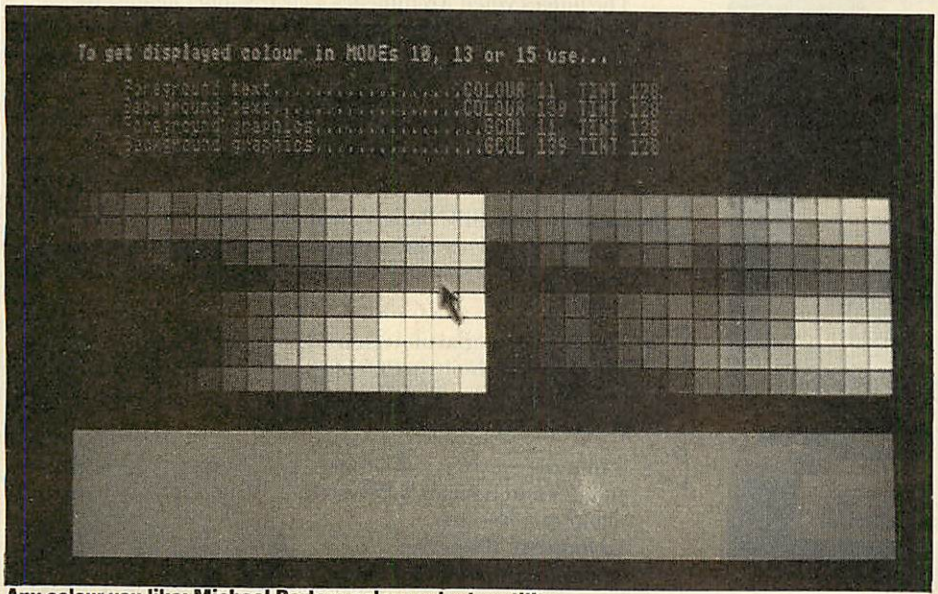
Ac. U. 2/88

ACORN FORUM

ARC OF THE RAINBOW

A palette for the Archimedes starts off a selection of readers' advice and programs

David Atherton



Any colour you like: Michael Porters colour selector utility

Welcome again to another selection of readers tips, with no technical punches pulled. Opening up this month is our first Archimedes utility program, from Michael Porter of Thames Ditton. Michael recently borrowed an Archimedes, and used his limited time profitably, writing a colour selector utility.

Running the program displays a table of 256 small squares, one in each of the 256 preset logical colours. The colours are grouped together in a way similar to that used by the 'Sprite Editor' on the Welcome disc. The user controls a pointer using the mouse. The pointer moves around the table of colours. To select a particular colour, position the pointer over the appropriate square. At the top of the screen the commands for generating the indicated colour as foreground, background, text or graphics are displayed.

When writing the program, Michael came across two errors in the User Guide, concerning the TINT command. This allows you to vary the whiteness of a particular colour in 256-colour modes. There are 64 base colours, each with four different tints. The User Guide suggests that the command TINT n should be used, where n is a number from 0 to 3. But, this is incorrect – the tint is calculated according to bits 6 and 7 of the given number. This means that instead of using 0, 1, 2 or 3, you should use 0, 64, 128 and 192 instead. To allow 'n' to be a number between 0 and 3, use the command TINT n*64, or even simpler TINT n<<6.

It also states in the User Guide that the tint of a point cannot be read. Michael found this to be untrue; the function TINT (x,y) returns the tint at the point (x,y), again given as a multiple of 64. Of course, x can vary between 0 and 1279, y between 0 and 1023. This is the tint equivalent of the POINT command. Note that there must be no space between the keyword and the opening bracket.

This is like some of the other Basic keywords – RND and INSTR for example, where the opening bracket is effectively part of the keyword itself. Without it Basic cannot tokenise the line properly. Probably the most common error of this sort is to put a space after TAB.

£5

IMPROVEMENTS TO BROKEN DIRECTORY FIX

P J Dellar from Harpenden has found a small bug in Stephen Oxley's broken directory cure, from December's Forum. When repairing the root directory, the name buffer and zero page locations &70 to &7A are not initialised '$'. This leads to the directory title and name being blank or garbled. The problem is only cosmetic, as the operation of a *DIR $ command is not affected in any way. The source code can easily be amended by the following additions and alterations:

```
   90 A$="SAVE FIX"+STR$~
code%+" +342 FFFF"+start
$+" FFFF"+start$
 2210 BEQ skiperr
 2211 JMP err
 2212 .skiperr
 2361 LDA #ASC"$"
 2362 STA name
 2363 LDA #1
 2364 STA length
 4470 IF sum%=79959 THEN
 ENDPROC
```

Mr Dellar also points out that the FIX and FIND utilities run much more easily if they are assembled at location &700. If you do this, the current program will not be corrupted. FIX doesn't suffer from the Winchester problem mentioned above.

£5

UNDO ADFS E LOCKING

The Advanced Disc Filing System (ADFS) contains a special attribute to protect files; the E attribute means a file can only be *RUN and not loaded or listed. Once set, this attribute is not removable, and if you accidentally set it on a file, you're in almost as bad a position as if you corrupted or lost the file.

David Spencer has come up with a small Basic program (yellow pages listing 2)

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which removes the E attributes from all files in any specified directory, thus allowing you access to your files again. To use the program you must know the sector address of the directory containing the E files. The directory's address can be found using the *EX or *INFO command. Go to the parent directory above the one in question, and type *EX, or *INFO followed by the directory name. The hex address at the right-hand side of the resulting information is the sector address of the directory. A typical response might by:

```
*INFO Letters
LETTERS  DLR (17)  000
1E2
```

This would mean that the directory LETTERS had a sector address of &1E2. You can then run the program and answer 1E2 (no ampersand) to the 'sector address' query. (Note that the prompt should say 'of directory name' not 'or directory name'.) The program will run, and set every file in the LETTERS directory to give the normal read and write (WR) access. Although you need to be in the right place to read the directory sector number, the program itself doesn't care which directory you're in. The program will run on any BBC micro or Electron, and on 640k discs on the Archimedes.

Some commercial programs, of course, use the setting to stop unauthorised copying, but every one we've seen which uses this technique also has other protection. This is because the E attribute doesn't prevent the disc being copied with the *BACKUP command.

Don't try this program on such discs, as they may test for the attribute's presence.

The program works by reading in directory sectors from disc, altering the entries and then writing the sectors back. The E attribute is indicated where the top bit is set on the fifth byte of each filename. The alteration merely involves ANDing each fifth byte with &7F, effectively clearing the top bit. The entire directory is altered in this way, using a simple loop.

David has two other useful tips to impart to ADFS users with Winchester discs. The 11th byte of the Osword &72 command parameter block (XY+10) is unused, according to the Master Reference Manual. The value is indeed irrelevant when using floppy discs. However, this byte is passed unaltered to the SCSI controller board (the drive control electronics in a Winchester disc) and most controller boards insists that the byte is set to zero. If you are using David's FIND program from *AU* September 1987, you should alter the program to do this, by adding the following extra line:

```
3405 EQUB 0
```

You might also like to try the upgrades to the *FIND by C P Armstrong, which were published in December 1987 and on page 33 this month.

David's second tip is much more down to earth. You may not know that ADFS allows you to specify wildcard characters in the file specification, say a LOAD command. Say you wish to load a Basic program or a *View* file or whatever called 'MONDAY', and it is the only file on the disc whose name ends with a 'Y', then typing LOAD "*Y" will find and load it.

Incidentally, a single star refers to the first file on disc, so */* can be used on ADFS to *EXEC the !BOOT file.

This works because */ is short for *RUN and ADFS will *EXEC text files with execution address FFFFFFFF if you try to *RUN them.

£5

MODE 7 SIDEWAYS SCROLL

Stuart Oglesby from Warrington has sent a routine to soft-scroll the mode 7 screen horizontally. It works by calling the machine code after filling location &74 with the number of characters by which you wish the screen to scroll.

The routine will scroll screens to the right. It can be changed to scroll to the left by transposing the commands LDY #0 and LDY #27 after 'nextline', and changing the code INY: CPY #&28 in 'loop' to DEY:CPY #&FF.

Stuart's program doesn't work with the CRTC chip, like most do. Working a line at a time, he stores a byte from screen in temporary work space, and then moves the next byte of screen memory along into its place. This is continued for the whole of the line, and finally the last byte is replaced by the first once originally taken. The procedure is repeated 25 times for each line on screen. Byte &74 is then decremented and the whole procedure is repeated until &74 is reduced to zero. Because the mode 7 screen only takes up 1k of memory, soft scrolling like this is acceptably fast: with other screen modes it take a long time to do the equivalent byte movements. The code could easily be incorporated into your own program, such as a game, that needs sideways scrolling.

£5

ULTRACALC SPREADSHEET TIP

Here's a quick tip to finish from Lawrence Coxmore of Stanmore concerning BBC Soft's *Ultracalc 2* spreadsheet. This package has recently been slashed in price from £80 to £30. In mode 7, the spreadsheet allows colours to be used and reinstates a 'white' character (ASC11 135) at the start of each line. Also a 'cyan' character appears at the start of each line. When *Ultracalc* is used on the Master in modes 0-6, these characters appear as strange symbols. Although they don't affect anything, they are rather disconcerting. These characters can easily be made to disappear by redefining them as spaces. To do this type:

```
*BASIC
VDU 23,134,0;0;0;0;
VDU 23,135,0;0;0;0;
*CALC
```

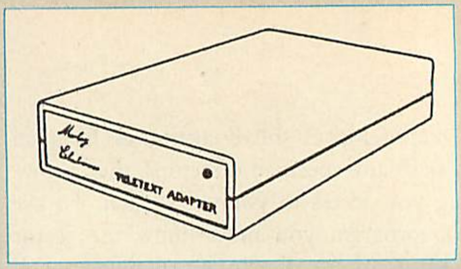
You can do this even when you have a spreadsheet in memory, because *Ultracalc* allows you to leave the spreadsheet and re-enter it later. Provided the spreadsheet data has not been corrupted, by loading in a Basic program for example, the sheet will be intact when you type *CALC. Leaving like this allows you to change the screen colours, for example, by typing VDU 19,0,4;0; before *CALC.

A further tip for *Ultracalc* users, which also applies to many other packages, concerns the use of function keys. Most business packages on the BBC micro use the function keys, and many use them in combination with Shift or CTRL for specific operations, thus preventing the insertion of user-defined strings, with *KEY.

However, the top level, Shift-CTRL plus the function keys, is often unused and this is the way in. If you define key strings in the normal way, using *KEY, and then, within the package, type *FX228, 1; you will find that pressing Shift-CTRL function key will generate the required string. This works within the *View* family, *InterWord* and *Wordwise*, for example.

Keep those submissions rolling in please; quirks, hints, tips and ideas, and of course shortish programs. Keep to the *Acorn User* style – one statement per line, lower case variables and good use of structures. Send both program and documentation (30-200 words) on tape or disc as well as on paper. Send your submissions to Acorn Forum, *Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

TELETEXT ADAPTER

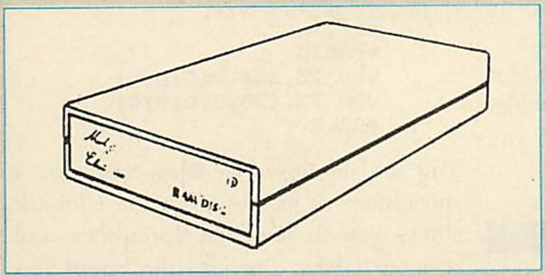


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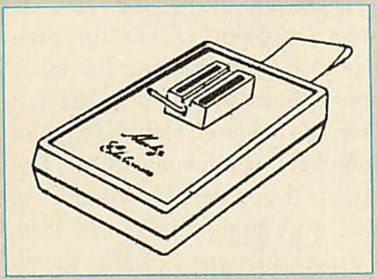
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MASTER CARTRIDGE

Designed and manufactured by Care Electronics to Acorn specifications. These high quality Master expansion cartridges will take two 16k sideways ROM's, and will, unlike similar cartridges available from other manufacturers, accept the new second generation programs, such as Computer Concepts Interword and Spellmaster ROM's.
These Cartridges come in a high quality, robust, formed-plastic case, that fits neatly into either one of the Master's cartridge slots.

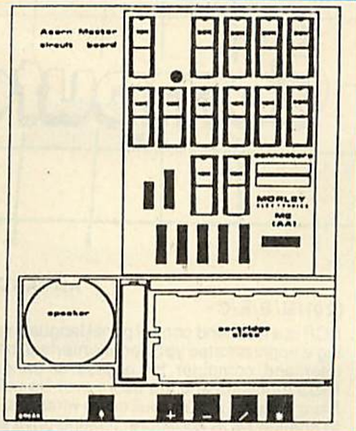
MASTER SMART CARTRIDGE

This device was designed and manufactured jointly by Morley and Care Electronics.
The **Smart** cartridge will at the press of a button halt any program running in memory and execute any one of a host of useful built in, or user defined procedures, and once completed will return to the program and continue where it left off. The only limiting factor with this device is the programmers imagination. The **Smart** cartridge will prive useful to the novice, allowing him to do the simple things like dump any screen to printer, and make backups of protected tape or disc based software, but has an open ended specification for the advanced 'HACKER' allowing advanced programming techniques to be incorporated into almost any program at the touch of a button.
BUILT IN FEATURES (at the press of a button)
Autosaves computer's entire memory.
Freeze program at any point.
Screen dump (any mode) to printer or disc.
Allows any OSCLI command without disturbing memory.
Copies 90% of protected software.
Tape to disc, disc to tape.
User friendly menu.
Sound On/Off.

ALL CARTRIDGES COME WITH A 12 MONTH NO QUIBBLE WARRANTY

MORLEY MASTER BOARD 'AA'

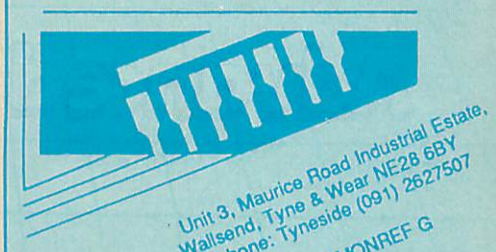
MORLEY
E·L·E·C·T·R·O·N·I·C·S



At long last the add-on all MASTER users have been waiting for, an internal ROM board.

No more need to turn the computer off to insert the cartridge containing the ROM you need to debug the program in memory.

The new **MORLEY MASTER BOARD "AA"** allows you to have up to 8x16k and 4x32k extra Roms installed inside your MASTER and still leaves the cartridge slots free. This in effect allows your MASTER to support as many as 24, 16k ROMs installed permanently, whilst retaining the standard 4 x sideways ram banks and four banks by using cartridges



Unit 3, Maurice Road Industrial Estate,
Wallsend, Tyne & Wear NE28 6BY
Telephone: Tyneside (091) 2627507

Telex: 265871 A/B MONREF G
(Quoting Mag 70211)

A staggering 32 ROM images installed and accessible at any time

Included in the package is a utility ROM which has many useful features such as 'FICOPY', a clever file transfer program that transfers files between DFS and ADFS formats or vice versa.

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DISC DRIVE COMPATIBILITY AT LONG LAST (Electron User June 86) this sums up AP4 & ACP's approach to producing products. AP4 is a fully ACORN compatible disc i/face & will accept any standard drive inc PSU runs 1770 DFS (as fitted in the B+ & Master) keeps page &Eøø utils in ROM & provides a spare rom socket. ACP's PLUS 4 comes out on top. I can recommend it to anyone (E U June 86)
AP4 should be considered the standard interface for the Electron (AU July 86)

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Also contains 2/3 ROM sockets and on board operating software for 2nd processor

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(14) /E+ASR/ **£19.99**

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(19) (M(ADM)/E+1(ADE) **£79.95**

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The company responsible for marketing and distribution of Advanced Computer Products

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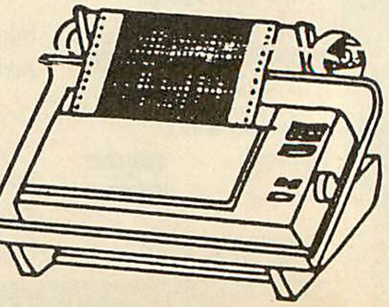
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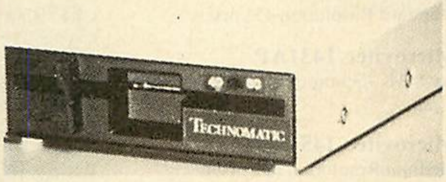
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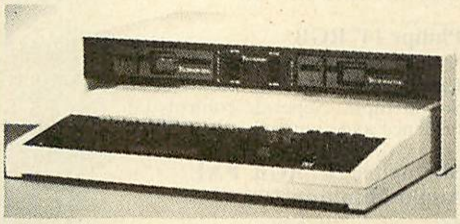
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PD 800P

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PS400 400K/640K with integral mains power supply	**£109 (b)**

5.25" Dual Drives 40/80 switchable:

TD800 800K/128OK	**£179 (a)**
PD800 800K/1280K with integral mains power supply	**£199 (a)**
PD800P 800K/1280K with integral mainspower supply and monitor stand	**£209 (a)**

3.5" 80T DS Drives:

TS351 single 400K/640K OFFER	**£75 (b)**
PS351 single 400K/640K with integral mains power supply	**£99 (b)**
TD352 Dual 800K/1280K	**£129 (b)**
PD352 Dual 800K/1280K with integral mains power supply	**£169 (b)**
PD853 Combo Dual 5.25"/3.5" drive with psu.	**£209 (a)**

DISC DRIVE MULTIPLEXER
(Suitable for DFS & ADFS)

TDM2 Dual Unit: 2 computers/one drive unit	**£69 (b)**
TDM4 Quad Unit: 4 computers/one drive unit	**£119 (b)**

TECHNOMATIC WINCHESTERS

Technomatic offer the most popular range of Winchester Drives for BBC Micro Systems at competitive prices.

All Winchesters are supplied with:

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P20HD TECHNOMATIC 20 Mbyte Winchester Drive	**£429 (a)**
P40HD TECHNOMATIC 40 Mbyte Winchester Drive with Acorn ADFS ROM	**£749 (a)**
P204HP TECHNOMATIC 20 Mbyte Winchester and a 80T DS floppy Drive built in a monitor stand. Includes ADFS Rom.	**£635 (a)**
P2041HT As P204HP but also with a 10 Mbyte tape streamer backup unit and backup utilities. Includes ADFS Rom.	**£1179 (a)**
TS10 10 Mbyte Tape Streamer Backup unit with utilities.	**£599 (a)**
TFC10 10 Mbyte Pre-formatted Cartridge for use with P2041HT and TS10.	**£19 (d)**

Technomatic Winchesters can be adapted to operate with the SJ Research FileServer by internal modification. However this must be specified at the time of ordering, otherwise the drive has to be returned to us for modification.
Adaptor for SJ FileServer **£28**

WINCHESTER Drive Multiplexer
These units let you share a Winchester drive between a number of computers. Full details on request.

TWM2 for two computers.	**£99 (b)**
TWM4 for four Computers.	**£149 (b)**

NEW

Following the tremendous demand for our P20 HD Unit we are pleased to announce the launch of the P30 HD – a 30 MByte Hard Disc Unit including our WIMP software and the ADFS Rom if specified. £495 (a)

3M FLOPPY DISCS

5.25" Discs in packs of 10

744 40T SS DD	**£8.50 (d)**
745 40T DS DD	**£10.50 (d)**
746 80T SS DD	**£11.50 (d)**
747 80T DS DD	**£13.25 (d)**

3.5" Discs in packs of 10

80T SS DD	**£15 (d)**
80T DS DD	**£19.50 (d)**

(Add £1 for library case packing)



BULK DISCS

50 5.25" 40 T single sided discs with sleeves in lockable box.	**£25 (b)**
50 5.25" 80 T double sided discs with sleeves in lockable box.	**£36 (b)**
50 3.5" 80 T double sided discs with sleeves in lockable box.	**£60 (b)**

FLOPPICLENE DRIVE HEAD CLEANING KIT

5.25" Kit with 20 disposable discs	**£12.50 (d)**
3.5" Kit with 20 disposable discs	**£14.00 (d)**

DISC STORAGE BOXES

DB340 Lockable 40 x 3.5"	**£8.50 (c)**
DB550 Lockable 50 x 5.25"	**£6.50 (c)**
DB570 Lockable 70 x 5.25"	**£8.50 (c)**
DB5100 Lockable 100 x 5.25"	**£10.50 (c)**

TECHNOMATIC

BBC COMPUTERS & ECONET CENTRE

17 Burnley Road, London NW10 1ED Tel: 01-208 1177

305 Edgware Road, London W2 Tel: 01-723 0233

PRINTERS

EPSON LX800 — £195 (a)

EPSON FX800 — An enhanced version of FX85. Call for details. — £299 (a)

EPSON FX1000 — An enhanced version of FX105. Call for details. — £405 (a)

EPSON EX800 — £409 (a)

EPSON EX1000 — £549 (a)

Colour option for EX800/EX1000. — £59 (b)

EPSON LQ850 — £439 (a)

EPSON LQ1050 — As LQ800 but wider carriage for 136 columns. — £529 (a)

TAXAN KP815 — Enhanced KP810 with 160cps and full IBM compatibility. — £269 (a)

TAXAN KP915 — Enhanced KP910 with 180cps and full IBM compatibility. — £369 (a)

National Panasonic KXP1081 — Now supplied with a BBC printer lead and our WYSIWYG Rom. This rom provides one of the most powerful and versatile printer drivers for WP and BASIC. (see description elsewhere in the directory) — £149 (a)

STAR NL 10 (Parallel Interface) — £179 (a)

STAR NL 10 (Serial Interface) — £219 (a)

INTEGREX Multicolour Inkjet printer. — Ideally suited for high res colour VDU screen dumps. Quiteness & consistent output are major characteristics. — £549 (a)

BBC Screen dump for Integrex. — £15 (d)

BROTHER HR20 — 8K buffer standard expandable to 16K. Parallel & Serial ports as standard. — £349 (a)

NAT PANASONIC KX P3131 — Daisy wheel printer with 38K buffer, 17 cps, bi-directional, parallel interface — £249 (a)

JUKI 6100 Daisy wheel printer — 15 cps, 2K buffer, switchable 10/12/15 cpi proportional spacing, underlining. Parallel interface. — £295 (a)

Parallel Printer Lead (1.2m) — £5 (d)

MODEMS

All modems listed below will be supplied with a BBC data lead.

MIRACLE WS4000 V21/23 — £135 (b)

MIRACLE WS3000 V21/23 — £244 (b)

MIRACLE WS3000 V22 — £409 (b)

MIRACLE WS3000 V22 bis — £537 (b)

(All modems are BABT approved)

BBC Data Cable for WS3000/4000 — £7 (d)

MIRACLE WS2000V21/23 & BELL stds — £92 (c)

WS2000 Auto Dial Card — £27 (d)

WS2000 Auto Answer Card — £27 (d)

WS2000 SK1 Kit — £5 (d)

WS2000 User Port Lead — £5 (d)

TIME WARP

Real Time Clock. Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program — £29 (d)

PLOTTERS

Hitachi 672XD A3 4 Colour HPGL (variety of pens available) — £465 (a)

Plotmate A4S — £282 (a)

Plotmate A3M — £431 (a)

Larger Plotters available. Please enquire.

PRINTER SHARERS & BUFFERS

TSB256 Printer Sharer Buffer — Provides a massive buffer size of 256K and connects three computers to one printer. Autoswitching between computers, facility to print copies. — £189 (b)

BUFFALO PB Buffer — Parallel buffer for internal fitting to most Epson printers. Simple to instal.

PB128 (128K) — £89 (c)

PERIPHERAL & COMPUTER SHARERS

High quality switches to allow the user to switch between computers, printers, modems etc. Fully shielded metal cases. all lines fully switched.

	Parallel		Serial
2 Computers to 1 Printer 36v36-2	£25(c)	25v25-2	£25(c)
3 Computers to 1 Printer 36v36-3	£39(c)	25v25-3	£39(c)
4 Computers to 1 Printer 36v36-4	£45(c)	25v25-4	£45(c)
2 Computers 2 Printers X-over 36v36-x	£49(c)	25v25-x	£49(c)
BBC Cable set 3 to 1 (1m ea)	£24(c)		
BBC Cable set 4 to 1 (1m ea)	£30(c)		

BBC Computer Sharer: TCS26 — 1 computer to 2 printers fitted with BBC cable — £21 (c)

Paper & Labels

Plain fanfold paper with microperforation:

2000 sheets 9½ × 11" — £12 (£3.50)

2000 sheets 14½ × 11" — £18.50 (£4.50)

1500 sheets A4 90gsm — £18.00 (£4.00)

Labels/1000

Single Row 3½ × 1 7/16" — £5 (d)

Triple Row 2 7/16" × 1 7/16" — £5 (d)

PROGRAMMING ACCESSORIES/SOFTWARE

Compatible with B, B+ and Master

EpromRyter (Epromer II) — Eprom Ryter is compatible with BBC Master only. See page 7. — £89 (b)

Upgrade of Epromer II to Eprom Ryter (Please return your Epromer II) — £49 (b)

EPROMER II — £89 (b)

MPROMER — £49 (c)

META ASSEMBLER — £145 (b)

PORTAL EPROM EMULATOR 512K — £245(b)

TEAM Disassembler — £145 (b)

EPROM ERASERS

UV1B 6 eproms, safety cutout — £47 (b)

UV1T 6 eproms, timer, safety cutout — £59 (b)

MONITORS

BBC lead incl with all monitors

MICROVITEC 14" RGB Monitors — Please specify plastic or metal case.

Microvitec 1431 — Standard Resolution 453 pixels — £179 (a)

Microvitec 1431AP — As 1431 + composite video and sound input — £199 (a)

Microvitec 1451 — Medium Resolution 653 pixels — £225 (a)

Microvitec 1451AP — As 1451 + composite video and sound input — £255 (a)

Microvitec 1441 — High Resolution 895 pixels — £359 (a)

Philips 14" RGB — Med Res, high contrast screen, TTL/Linear Input, Mono/Colour Switch Sound Input. Seperate controls for brillance and contrast. — £195 (a)

Microvitec 20" RGB/PAL/Audio Monitors

Microvitec 2030CS — Standard Resolution RGB/Comp Video — £380 (a)

Microvitec 2040CS — High Resolution RGB/Comp Video — £685 (a)

TOUCHTEC-501 — Brings genuine touch screen operation on metal cased Microvitec monitors, incl utilities disc with starter and development programs — £239 (b)

TAXAN SUPER VISION 620 — 12" Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible — £269 (a)

TAXAN SUPER VISION 625 — 12" Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible. — £319 (a)

12" MONOCHROME MONITORS

TAXAN KX 117 — Hi Res green etched screen — £85 (a)

TAXAN KX 118 — Hi Res Long Persistence (P39) — £90 (a)

TAXAN KX 119 — Hi Res amber etched screen — £90 (a)

PHILIPS BM 7502 — Hi Res green screen. — £69 (a)

PHILIPS BM7522 — Hi Res amber screen. — £75 (a)

PHILIPS BM 7542 — Hi Res White screen. — £79 (a)

MONITOR ACCESSORIES

Microvitec Swivel Base (14" plastic monitors) — £17 (c)

Philips Swivel Base — £10 (c)

Monitor Stand Models B & B+ — £10 (c)

Monitor Stand Master — £13 (c)

Double Tier stand Models B, B+ or Master — £24 (b)

Taxan RGB Lead — £5 (d)

Microvitec Lead — £3.50 (d)

Monochrome BNC/Phono Lead — £3.50 (d)

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(b) £2.50
(c) £1.50
(d) £1.00

CAD/DRAWING PACKAGES

NOVACAD
Cad Package for B, B & MASTER.
(See page 5 for specification)

Tracker Ball/Mouse Version (TM)	£49 (d)
TM Version plus Tracker Ball	£94 (d)
TM Version plus Mouse	£79 (d)
Plotter Driver Generator	£15 (d)

MOUSE

AMX MOUSE with SUPER ART (pse specify B, B+ or Master)	£59 (d)
STOP PRESS (Pagemaker)	£32 (d)
EXTRA/EXTRA (utility for the Pagemaker)	£19 (d)
MAX	£17 (d)
STAND ALONE MOUSE (includes horizontal scroll lock)	£34 (c)

RB2 TRACKER BALL

RB2 Tracker Ball with Icon Master (for B, B+ & Master)	£59 (c)
RB2 Tracker Ball with Cursor Control Rom (for Master only)	£59 (c)
RB2 Tracker Ball 'Stand Alone' for use with NOVACAD & other software)	£47 (c)
Cursor Control Rom for Master	£12.50 (d)
MIRRORSOFT FLEET STREET EDITOR	£35 (d)

CP/M SOFTWARE

Send for details on our full range of CP/M & PC DOS packages for Business, Communications & High Level Languages.

Please send for details on our range of CP/M software for Acorn/Torch Z80 2nd Processors

BBC SOFT/FIRMWARE

DATABASE MANAGEMENT SYSTEMS

VIEWSTORE	£37 (d)
STARdataBASE	£39 (d)
MASTERFILE II	£17 (d)
ACORN OVERVIEW PACKAGE Special Offer (RRP £86)	£69 (b)

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ACORN VIEW PROFESSIONAL (BBC)	£85 (c)
VIEW 2.1	£35 (d)
VIEW 3.0	£48 (c)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR	£7 (d)
VIEWSPELL	£29 (d)
DOT PRINT PLUS	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS	£21 (d)
SPELLMASTER	£47 (d)
INTERWORD	£39 (d)
WORDEASE	£24 (d)
SPELLCHECK III	£31 (d)
EDWORD II	£43 (c)

SPREADSHEETS

VIEWSHEET	£37 (d)
WINDOWMATIC	£15 (d)
VIEWPLOT	£22 (d)
INTERSHEET	£37 (d)
INTERCHART	£26 (d)
ULTRACALC	£26 (d)
MINI OFFICE II DISC Version	
For B & B+ 40T or 80T	£14.75 (d)
For Master 80T	£17.30 (d)
For Compact	£19 (d)
MINI OFFICE II ROM Version For Master, Compact, B+ & B	£48 (c)

LANGUAGES

META ASSEMBLER	£145 (b)
TEAM DISASSEMBLER	£145 (b)
MACROM	£33 (d)
ACORN MICRO PROLOG	£62 (d)
ISO-PASCAL	£51 (c)
ISO-PASCAL STAND ALONE GENERATOR	£30 (d)
OXFORD PASCAL (40 or 80T) Specify B or B+	£36 (d)
OXFORD PASCAL for Master	£52 (d)
ACORN LOGO	£46 (c)
LOGOTRON LOGO	£55 (c)
BBC PUBLICATIONS OPEN LOGO	£59 (c)
ACORN LISP ROM	£39 (d)
ACORN FORTH ROM	£39 (d)
ACORN COMAL ROM	£39 (d)
MICROTEXT	£52 (c)
MICROTEXT PLUS	£229 (b)

COMMUNICATIONS

TERMULATOR	£25 (d)
COMMSTAR II	£28 (d)
COMMUNICATOR	£49 (d)
MODEM MASTER	£11 (d)
COMMAND	£34 (d)
MASTER TERMULATOR	£34.75 (d)

UTILITIES

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ACORN BASIC EDITOR	£24 (d)
MONITOR (BBC Pub)	£19 (d)
BROM PLUS	£26.50 (d)
SLEUTH	£23 (d)
TOOLKIT PLUS	£31 (d)
TOOLBOX 2 (BBC Pub) Manual	£9.50 (d)
Cassette	£9 (d)
ACORN GXR GRAPHICS ROM specify B or B+	£24(d)
PRINTMASTER	£24 (d)
PRINTWISE	£24 (d)
DUMPMASTER	£26 (d)
FONTWISE PLUS	£17 (d)
HERSHEY FONT CHARACTER GENERATOR	£18 (d)
ICON MASTER	£29 (d)
MOVIE MAKER Two Roms + Cassette	£26 (d)
ADV TELETEXT UTILITIES ROM	£7.95 (d)

COMPACT (all on 3½" disc)

ARTROOM	£27 (d)
FONTWISE+	£22 (d)
FONT EDITOR	£22 (d)
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MACROM	£37 (d)
BETABASE	£27 (d)
WHITE KNIGHT MKII	£16 (d)
BBC PUBLICATIONS BUNDLED SOFTWARE	£18.50 (d)

BBC PUBLICATIONS EDUCATIONAL SOFTWARE

A series of programs developed in many cases alongside Radio & TV programmes by BBC's Education Department which supplement the classroom studies by moving and colourful displays helping in clear understanding of a variety of subjects. Some packages also include audio cassettes.

PRIMARY EDUCATION

ASTRONOMY		£11 (d)
COMPUTERS AT WORK	Aud/EC/disc	£16 (c)
PICTURE CRAFT	Disc	£17 (d)
INTRODUCING GEOGRAPHY	Disc	£16 (d)
MATHS WITH A STORY 1	Cass	£8 (d)
MATHS WITH A STORY 2	Cass	£8 (d)
NUMBER GAMES	Cass/EC	£7.50 (d)
USING YOUR COMPUTER	Cass	£24 (c)

SECONDARY LEARNING

TECHNOLOGY & DESIGN Pt1		£21.50 (c)
ELECTRIC FIELDS		£10.50 (d)
ADVANCED LEVEL STUDIES: STATISITICS	Disc	£23 (d)
ADVANCED STUDIES: GEOGRAPHY	Cass	£10 (d)
INSIDE INFORMATION	Prog Cass	£10 (d)
	Book £8 (d) Audio Cass	£5 (d)
SCIENCE TOPICS (ST)		
S.T.:WAVES	Disc	£14 (d)
S.T.:RELATIONSHIPS	Disc	£14 (d)
S.T.:BONDING	Disc	£14 (d)
S.T.:ELECTROMAGNETIC SPECTRUM	Disc	£14 (d)
S.T.:ELECTRONICS IN ACTION	Disc	£14 (d)
S.T.:NEWTON & THE SHUTTLE	Disc	£19 (d)
S.T.:ECOLOGY	Disc/EC	£19 (d)
S.T.:POLYMERS	Disc/EC	£19 (d)
S.T.:CLASSIFICATION & PERIODIC TABLE	Disc	£20 (d)
S.T.:FOOD & POPULATION	Disc	£20 (d)
SEC.SCIENCE MICROTECHNOLOGY	Cass	£7 (d)
SEC.SCIENCE:THE MOLE CONCEPT	Disc/Aud/EC	£16 (c)

GENERAL

VU-TYPE PROFESSIONAL	Disc	£19 (d)
WHITE KNIGHT MK II (for compact)	Disc	£16 (d)
BATTLEFIELDS	Cass	£8.50 (d)
A VOUS LA FRANCE	Cass/EC	£17 (d)
	Book	£5.25 (d)
	Audio Cassettes (2)	£7.50 (a)
Additional charges for discs		£9.00 (d)
DEUTSCH DIREKT	Disc/aud/EC	£16 (c)
	Book	£5.95 (d)
MODEM MASTER		£11 (d)

Cassette based programs listed above can be supplied on disc at an extra charge of £1.50 per disc and please specify the format required 40 or 80T.

TECHNOMATIC

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BOOKS

No VAT Carriage Code (c)

LANGUAGES

6502 Assy Lang Prog £19.95
6502 Programming £13.95
8086 Book £23.95
Acorn BCPI User Guide £15.00
Acorn FORTH £7.50
Acorn LISP £7.50
Acorn ISO Pascal Ref Manual £10.00
Intro to COMAL £10.00
Intro to LOGO £7.50
Micro Prolog Ref Manual £10.00
Introduction to Turbo Pascal £14.95
Prog the Micro with Pascal £8.50
The Supervisor's BBC Micro £10.95

BBC MICRO GUIDE BOOKS

Inside Information £8.95
Maths Prog in BBC Basic £7.95
The Friendly Computer Book £4.50
Toolbox 2 .... £10.95

PROGRAMMING/UTILITY

Advanced Sideways Ram User Guide £9.95
Advanced User Guide (BBC) £15.95
Applied Assembly Language on the BBC ... £9.95
BBC Micro Advance Programming £9.95
BBC Micro Ref Guide (B Smith) £10.95
BBC Micro Sideways ROM's RAM's £9.95
Guide to the BBC Rom £9.95
Beginners Guide to W.P. £7.95
Mastering Assembly Code £8.95
Mastering Interpreters & Compilers £14.95
Master Operating System £12.95
Mastering View, Viewsheet & Viewstore £12.95
View by B. Smith £12.95
View 3.0 User Guide £9.00
Viewstore User Guide £9.00
Viewsheet User Guide £9.00
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DISC DRIVE SYSTEMS

Advanced Disc User Guide £16.95
Disc Book £3.50
Disc Programming Techniques £7.95
Disc Systems £6.95
File Handling on the BBC £6.95
Discovering Disc Drives .... £POA
Practical Disc File Techniques £5.95
Mastering the Disc Drive £12.95
Mastering DOS plus £12.95

APPLICATIONS

Interfacing Proj for BBC £6.95
BBC and Small Business £5.75
The Software Business £5.50

Mastering Operating System (David Atherton) £12.95

WYSIWYG PLUS

WYSIWYG PLUS is a printer and screen utility for Wordwise Plus, View, Interword, and Basic users, supplied on a 16K Eprom. To obtain a particular printer effect, such as enlarged text, it used to be necessary to discover the appropriate 'printer control code' from your manual and incorporate it into your text. Secondly, you had to print several trial copies in order to position the effect correctly in relation to the rest of your text.

WYSIWYG PLUS simplifies this trial and error approach using easily remembered *commands. For example, *ENLARGED not only selects enlarged text on your printer, but uniquely shows you double width characters on your screen, even from within Wordwise Plus!

WYSIWYG PLUS incorporates a logo editor. Just draw your design on screen using the arrow keys, and save the results. Use the *GRAPHICS command to incorporate your design anywhere in your text; position and see your design in your text before faithfully reproducing a hard copy.

There is also special help for daisy wheel users. The *WHEEL command will prompt you to change daisy wheels whenever a change in type style is about to occur.

WYSIWYG PLUS is designed to work with the following systems:

BBC Model B
BBC Model B+
BBC Master 128
BBC Compact
6502 Second processor,
Turbo coprocessor
All printers (Except lasers)

WYSIWYG PLUS workspace is relocatable.

WINDOWMATIC

All users of Acorn's VIEWSHEET speadsheet program will be aware of its powerful windowing facility which allows the screen and/or printer to be configured in up to 10 seperate windows taken from anywhere in the sheet. They will also be painfully aware of how difficult and time consuming it is to set up a required display. Although VIEWSHEET allows configurations to be saved to the media, it does not have provision for deciphering them.

WINDOWMATIC has been produced with the intention of rectifying these shortcomings and to bring out the very best from VIEWSHEET.

WINDOWMATIC provides a quick and easy way to configure screen and printer allowing complicated documents and reports to be set up much more easily. It displays complete text information on all 20 windows and accurate graphic representation of the screen and printer output.

The package includes a screen dump routine for Epson printers and allows use of other printer dump packages.

WINDOWMATIC is compatible with BBC Master and BBC B+. A 6502 2nd processor must be fitted to a model B to run Windowmatic. Windowmatic is fully compatible with Turbo and 6502 2nd processor.

The program is supplied on disc with a comprehensive manual.

VU-TYPE

Do you have finger trouble when typing?
Do your letters look like this?

Dear Sor,
I wuold like to .....

then you need:

VU-type, a complete touch typing program produced by BBC/Pitman.

It allows you to learn at your own pace and has a wide range of exercises. Screen displays show the keys you have pressed and it will report on your speed and accuracy.

Supplied on a 40T Disc with a manual.

Available at a special price of £7.50(d) instead of the usual £15. Offer valid while stocks last

EDUCATIONAL/FUN SOFTWARE BUNDLE

Wordmover
Wordplay
Pantry Antics
Drawstick
Locomotion

These programs are supplied from the BBC Publications Educational Software range and will be supplied on a 5.25" disc for BBC Master, B+ and B and on a 3.5" disc for the Compact.

5.25" Disc £17.50(d)
3.5" Disc £18.50(d)
(Normal RRP over £40)

PRINTER ACCESSORIES

EPSON ACCESSORIES:

Interfaces

8143 RS232 .... £30 (d)
8148 + RS232 + 8k .... £65 (d)
8177P NLQ for FX80 +/FX100 + .. £99 (d)

Parallel & Serial Buffers of various size also available.

LQ800 Tractor Feed .... £47 (b)
LQ1000 Tractor Feed .... £52 (b)

SHEET FEEDERS:

LQ800 .... £135 (b)
LQ1000 .... £179 (b)
EX800 .... £135 (b)
EX1000 .... £309 (b)
FX800 .... £135 (b)
FX1000 .... £179 (b)

Ribbons:

RX/FX100/100 +, FX105 .... £7 (d)
RX/FX80/80 +, FX85 .... £4 (d)
LX80/LX800 .... £4.50 (d)
LQ800 .... £8.50 (d)
LQ1000 .... £10 (d)
EX800/1000 .... £7.50 (d)
H180 Pen Set (Aqueous/Ball point) .... £8.25 (d)

HITACHI 672 Plotter

Aqueous Pen Set six pens .... £18.50 (d)
Oil Based Pen Set six pens ... £25.00 (d)

TAXAN CANON Accessories:

Ribbon, KP810/815/910/915 ...... £6 (d)

Star Printer

NL10 Sheet Feeder .... £52 (b)
NL10 Ribbon .... £4.50 (d)

National Panasonic KX P1080/81

Spare Ribbon .... £4.50 (d)
KXP3131 Tractor .... £90 (a)
KXP3131 Sheet Feeder .... £189 (a)

JUKI 6100

Tractor Feed .... £149 (a)
Ribbon (Carbon) .... £2.00 (d)
Sheet Feeder .... £219 (a)

BROTHER HR20

Tractor Feed .... £116 (a)
Spare Ribbon Nylon .... £3.00 (d)
Spare Ribbon Carbon .... £4.50(d)

INTEGREX INK JET COLOUR PRINTER

Spare Ink Cartridge Black .... £9 (d)
Spare Ink Cartridge Colour ...... £15 (d)
Paper Roll .... £7 (d)

Printer Leads:

BBC Parallel Lead (1.2m) .... £6 (d)

PAPER & LABELS

Plain Fanfold paper with micro perforations:

2000 sheets $9\frac{1}{2}$" × 11" 60 gsm/sq m .. £12 (£3.50)
2000 sheets $14\frac{1}{2}$" × 11" 60 gsm/sq m £18.50 (£4.50)
1500 sheets A4 90 gsm £18 (£3.50)

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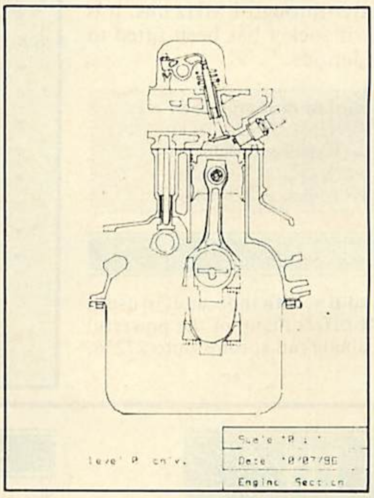
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* Block copy of shapes on the screen for repetitive use.
* Text entry at any 90° orientation at any position on the screen.
* Create multi layer drawing with 8 levels available.
* Full compatibility with the BBC range with minimal hardware requirements yet having the capability of exploiting the potential of the extra shadow memory or the second processor's memory and speed.
* Printer routine for Epson 80 and 136 column printers.
* A unique optional facility to output to any BBC compatible plotter.
* Cursor control from keyboard, tracker ball or mouse.



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Plotter Driver Generator £15(d)

NOVACAD is compatible with all BBC models fitted with Acorn DFS. It has minimum hardware requirements of a single drive and a Epson compatible printer to get started though NOVACAD will utilise fully a dual drive system and 6502 2nd processor or the shadow ram on the B+ series. To obtain high quality drawings we recommend a BBC compatible plotter and our plotter driver generator.

With basic BBC B, NOVACAD operates in mode 4 allowing use of any 2 colours. With shadow memory of the BBC+ or the Master, it can also operate in mode 0 for higher resolution or mode 1 for allowing use of any 4 colours, and it will provide additional user memory for more complex drawings.

6502 second processor or the Turbo on the Master will also increase the drawing speed considerably.

OPTIONAL EXTRAS

Plotter driver generator is available as an optional extra to configure a plotter routine for any BBC compatible plotter. Pre-configured programs for the popular plotters like **Epson HI 80, Hitachi 672, Plotmate, Penman** and **HP GL.** This program allows the drawing to be scaled to the maximum plotter size thus enabling drawing of A2 and A3 sizes to be produced with equal ease. The zoom facility will enable inaccuracies of drawing on the screen to be eliminated.

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Item	Price
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Item	Price
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- Also A suffix eproms such as 27XXXA



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- * Automatic Intelligent identifier support for eproms able to respond.
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- * Block move of data within the address range.
- * User can select any section of the eprom from single byte to the full address range to blank check/burn/verify. Facility to program single bytes makes program development/amendment simpler.
- * Multiple loading for ROM Filing System

Some of the above features apply to Master Computers only

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Acorn User October 1986

- Assembles for over 30 popular processors, including Z80, 6800/01/02/04/05/09/11 etc — and 68000 — using native mnemonics for each processor, eg. LD A, (HL) for Z80 and MOV AO, $1000 for 68000 etc.
- Fully integrated Editor: four field, all search, search/replace, block copy, delete, move, marked save, load etc.
- Compatible with Portal Eprom Emulators and Team Disassemblers.
- Send object code in Intel Hex, S-Record, straight binary etc. down to discs, RS232, parallel port, Eprom Emulators etc — all **during Assembly.**
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- Up to 64K of object code translated back into META compatible source code modules: labels automatically inserted on all jump targets, memory references etc.
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BY POPULAR DEMAND OUR SHOP IS NOW OPEN UNTIL 8PM EVERY THURSDAY

All prices exclusive of VAT; subject to change without notice & available on request.

Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

Acorn The choice of Experience

The choice before and after the experience

Archimedes micro

A Computer for BUSINESS, RESEARCH, EDUCATION & HOME USE

The Acorn Archimedes range of microcomputer comprises of four machines – the 305 and 310 with 0.5 and 1 MB of RAM, and the 410 and 440, with 1 and 4 MB. All have 0.5 MB of ROM and one 3.5" floppy disc drive of 800K as standard. The 440 also has a Winchester drive of 20MB – all mounted internally.
They have separate keyboard and a three button mouse as standard. The Keyboard is compatible with the new IBM ATE layout, with 12 function keys.
The standard display is a high resolution mono colour monitor. A colour, multifrequency monitor is optional.
The screen modes include:

- 80 × 25 or 32 characters, in 2, 4 or 16 colours for wordprocessing, etc.
- 132 × 25 or 32 characters, for spreadsheets, etc.
- Up to 640 × 256 dots × 256 colours (with single frequency monitor) and up to 640 × 512 dots × 16 colours (with a multi frequency monitor), for graphics, etc.

The sound system can have upto eight channels playing at once, from up to 32 instruments or voices, using waveform synthesis and stereo output.
The outlets for the monitor, printer, serial port and audio are all at the rear, and have industry standard connectors.
The 410 and 440 have a backplane for four expansion podules and the circuitry for a Winchester disc drive as standard.
The complete operating system – including Window Manager and Desktop – is in 0.5 MB of ROM. It can access directly all the RAM that can be fitted (upto 4 MB).
The Advanced Disc Filing System uses robust, pocket-sized 3.5" discs with a new 800K format, but also reads, writes and formats the 640K discs used by the Master series. As well as 25% more capacity, the new format allows almost four times the data transfer rate.
A battery-backed clock-calender, and CMOS RAM to hold configuration setting is standard.
Expansion is via internal plug-in boards (podules), which connect with the backplane.

ARCHIMEDES PRICES

305 Series

Entry System	£699
with Green Monitor	£749
with Colour Monitor	£899

310 Series

Entry System	£775
with Green Monitor	£825
with Colour Monitor	£975

310M Series

Entry System	£835
with Green Monitor	£885
with Colour Monitor	£1035

410 Series

Entry System	£1399
with Green Monitor	£1449
with Colour Monitor	£1599

440 Series

Entry System	£2299
with Green Monitor	£2349
with Colour Monitor	£2499

0.5 Mb RAM for 305	£85
Podule Backplane	£37
ROM Podule	£37
Archimedes Ref Manual	£20
ARM Assem. Lang Prog Manual	£12

(Securicor carr. £7 on Micros)

Podules expected this year (from Acorn unless stated) include:

2nd 800K floppy disc drive (for 305, 310 & 410)	£125
Econet Network Board	£43
Backplane for 2 podules, with fan (305, 310)	£49
I/O Podule (with User port, Analogue port & 1MHz bus)	£79
MIDI add-on to I/O Podule	£29
ROM Podule (takes five 8 bit ROMs, of 16, 32, 64 or 128K)	TBA
Modem Podule (Beebug)	TBA
Real time Video Digitiser (Watford)	TBA
Sound Sampler (Armadillo)	£78
Speech Podule (Tubelink)	TBA

Due in the 2nd quarter 1988

PC Podule, with 10 MHz 80186, 640K and floppy disc interface, (for all models). This should run about 3.5 times as fast as an IBM-PC. Fully IBM compatible.

SPECIAL OFFER

With every Archimedes Micro purchased from us, we are giving away absolutely **FREE** a 5¼", double sided disc drive with PSU, (1 Megabyte unformatted), plus the special Archimedes interface cable, worth **£125**.
(P.S. This offer does not apply with 0% finance scheme mentioned below).

0% (APR) FINANCE

*For a limited period, Watford Electronics are able to offer the Archimedes range of microcomputers at **0% (APR)** finance. Credit facility available for up to 12 months, subject to status. Please inquire for further details. (Watford Electronics are Licenced Credit Brokers)*

NEW

CREDIT TERMS now available. Please telephone or write in for further information.

What Archimedes does and can do

The software on the welcome disc includes four applications.
"PAINT" is a simple mouse driven art package, operating in the 640 × 250 × 16 colour screen mode. Images can be produced without any programming and saved to disc for use elsewhere.
The sprite editor allows sprites to be created pixel by pixel in the 640 × 256 × 16 and 256 colour screen modes. It can also be used to edit pictures from "Paint". The results can be used in Basic programs for animated graphics.
The Font Designer allows you to design individual letters and symbols – and save them together as a font". They may be "anti-aliased", for even better appearance on screen.
The Music Editor allows you to enter music in standard notations, with upto four "parts", and save it to disc. It may be played via the internal speaker (in mono) or via external headphones or hi-fi (in stereo). The voices or instruments (or which there are nine as standard), and their volume, tempo and stereo position may all be varied while playing.

BBC Basic 5

This is upwards compatible with earlier versions, so most programs written in them will run – though far faster. Even using a 305, upto 370K is available in Basic. It also affords access to all the new graphics, windowing and sound facilities – as shown by the applications on the Welcome Disc. As well as being in the system ROM, BBC Basic 5 is provided on disc for loading into RAM because it then runs about 40% faster. This speed makes it the FASTEST MICRO IN THE WORLD". BBC Basic 5 includes an in-line Assembler.

WORDPROCESSORS

Wordwise +	£20
Image-Writer	£26
Interword ROM	£39
View	£50

DATABASES

System's Database	£26
Alphabase	£43
Viewstore	£52

SPREADSHEETS

Intersheet ROM	£39
Viewsheet	£50

BUSINESS GRAPHICS

Interchart ROM	£25
System's GammaPlot	£30

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet time management & Business Graphics — £99

ACCOUNTS PACKAGES

Medow Computers' suite of 4 Modules
Minerva's suite of 5 Modules
P.O.A.

ART & DESIGN

Artisan — £34

GAMES

Zarch — £17

EDUCATION

A great many packages are expected in early 1988. The topics include: Business Studies, Maths, General Science, Biology, Physics, Chemistry, Economics, Geography, History & Music.

PC EMULATION

The Acorn PC Emulator (for 310, 410 & 440), includes MS-DOS 3.21 and is available NOW at £99. It runs most MSDOS and many PC-DOS applications (which number over 10,000). Compared with IBM PC, this all-software emulator can calculate about half as fast, and write to the screen about a quarter as fast. This makes it more suitable for running spreadsheets (such as Lotus 1-2-3) than wordprocessors (such as Wordstar). However it includes utilities for copying disc files between DOS and ADFS formats, so that data may be transferred to and from Archimedes applications. The 3.5" discs used by the new IBM PS/2 models, and by many DOS portables, may be read, written and formatted directly. 5.25" discs require an additional, external drive, which is available as an option. The PC Podule (due second quarter '88), will run very much faster.
£99

LANGUAGES

Acornsoft ANSI "C", ISO-Pascal, Fortran 77, Cambridge LISP and PROLOG X are all available now at **£95** each, as is the Twin Editor, at **£29**. These require at least a 310. The ANSI "C" affords access to all the graphics, windowing and sound facilities of the Archimedes and executes at exceptional speed – 14 to 26 times that of a PC, 5 to 10 times that of an AT, and as fast as most 386 machines. (For demonstration, call in at our retail shop.
If you require technical literature, then simply telephone us).

Archimedes to BBC SERIAL LINK

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with two disks, one 5.25" for the BBC, the other 3.5" format for the Archimedes, and the necessary cable to connect the two computers. Using this package it is possible to transfer any data from the BBC to Archimedes at upto 19200 baud.
By far the easiest way to transfer data to your new computer.

Only £25

Archimedes 5¼"/3½" Disc drive Interface

With this interface it is possible to connect almost any 5¼"/3½" disc drive with its own power supply to the Archimedes. Upto FOUR drives can be connected and NO SOLDERING is involved. Supplied complete with necessary lead.

Only £25

Note: This is not simply a lead. Attempting to connect an external disc drive by direct connection may result in damage to your Archimedes.

BBC MASTER

BBC MASTER 128K Micro incl. Acorn's: View, Viewsheet, ADFS, BASIC Editor & TERMINAL **£379**

SPECIAL OFFER

FREE . . . £105 worth of Hardware & Software

*Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control and **Watford's** 3½", double sided 1 Megabyte (unformated) single disc drive complete with cables, ready to connect to the micro – with every BBC Master purchased from us this month.*

BBC MASTER with Turbo Board + above SPECIAL OFFER	**£475**
512K Processor Add on Board "inc. Mouse and GEM package"	**£185**
BBC AIV (Domesday) System	**£4479**

ADD-ONs & ACCESSORIES

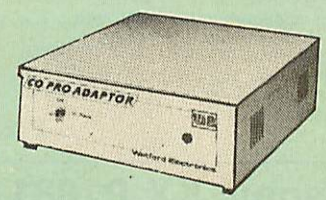
Turbo 65C102 Add-on Module	£95
Econet Module for the Master	£40
Twin ROM Cartridge for Master	£7.50
Quad ROM Cartridge for Master	£12
Universal Processor Adaptor	£75
Reference Manual I	(No VAT) £14
Reference Manual II	(No VAT) £14
Advance Ref. Manual	(No VAT) £19
64K Upgrade Kit for B+	£32
Acorn 1770 DFS Kit complete	£41
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
Z80 Acorn 2nd Processor package	£325
ARIES' Professional IEEE Interface	£238
Acorn IEEE Interface Complete	£265
Morley Teletext Adaptor with ATS Rom	£99

BBC MASTER COMPACT

All Master Compact Microcomputers are supplied complete with an integral 3½" Disc Drive and various educational and professional bundled software.

System 1	Standard Package	£310
System 1A	System 1 + TV Modulator	£322
System 2	System 1 + Green Hires Monitor	£364
System 3	System 1 + Medium Res Colour Monitor	£478
RS232 Kit for BBC Compact		£25
Additional 3½" Drive for BBC Compact (Securicor carriage £7)		£90

CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.
Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.
With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.
To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.
Master owners may use Co-Pro to add a second Co-processor externally.
Watford, brings power to your BBC at only:

£35 (carr £5)

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

The 80186 Co-Processor

This package consists of the Master 512 board, Watford Co-Pro Adaptor, 1770 Disc Upgrade and Acorn ADFS. The Master 512 board using the 80186 16 bit Processor at 10MHz and running Digital Research DOS Plus, gives a high degree of IBM compatibility at an extremely reasonable price. Included in the 512k package is a mouse and the amazing Digital Research GEM suite of software; GEM Paint, GEM draw and GEM desktop giving a complete Mouse Icons environment (All other GEM packages will work on the 512k). Famous packages that will work with the 512k board include Wordstar, Dbase II, Lotus 123 and many others. The only requirement to upgrade any BBC Model B to this system is you must have twin 80 track disc drives.

£259

65C102 2nd PROCESSOR

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B.

£135

SPECIAL OFFER

EPROMs for BBC's Sideways ROMs

2764-250nS £3.00
27128-250nS £3.50

RAMs (Low power) for ATPL, WATFORD, etc., Sideways ROM Boards

6264LP (8K) £2.50
2 × 6264LP (16K) £4.80

NEW Z88 Sinclair's Portable Micro

Watford Electronics announce a very special new – and affordable portable microcomputer, tailor-made for the BBC Micro user on the move – the Cambridge Z88.

The Cambridge Z88 is a versatile portable micro, bursting at the seams with built-in software ready and waiting for you to use at the push of a button. There is BBC BASIC, a word processor, a database, a terminal, a filer a diary and a calculator, all integrated and all inclusive!

The Cambridge Z88 uses just four AA batteries, and from this it will store all of your programs and files on a built-in RAM disc, so there are no cassettes to worry about or discs to lose.

The LCD display is particularly impressive, using state of the art Supertwist technology, the display is sharp at all times, and clear under even the worst lighting conditions.

The word processor is based on Acorn's View package; View is the most popular word processor available for the BBC Micro, and files and programs written on the Z88 can be transferred to and from the BBC Micro with consummate ease.

The Pipedream word processor is possible the single most powerful package written for a portable yet! Being an integrated Spreadsheet and word processor you can combine text and numbers to create stunning reports, timetables or simply letters in a variety of column widths (up to 80 column) and numeric data can be freely sorted searched and calculated INSIDE a text file – a feature only previously available on much more expensive software packages running on large machines.

Nearly all of the 32K memory is available as the RAM Disk, although additional memory packs of 128K are also available, just plug them into the machine (no soldering – no screwing) and you have four times the memory you had before, all of which is available to the Word Processor.

Connecting the Z88 to the BBC Micro is easy; by plugging in the RS232 cable from the Z88 into the RS423 socket in the back of the BBC Micro, a data exchange as fast as 19200 baud is achieved, making the Z88 a fast machine for data transfer.

Custom software is available for the BBC Micro enabling automatic transfer of files to and from the Z88 with automatic conversion and full error checking. The connecting lead plugs straight into the back of the BBC Micro and into the side of the Z88 to form a reliable data link faster than some disc drives!

The Z88 is rugged, reliable, lightweight and compact. It is considerably lighter than all other portable computers currently available, and because it doesn't need disc drives, it is more reliable than any PC "laptop" portables making it especially useful to the BBC Micro owner away from work or home.
home.

Here's what A&B Computing had to say about the Z88:

"The Z88 is an especially worthy machine to have on the move because the files it creates in Pipedream are directly compatible with View Professional... you can write a full report using all of the facilities of Pipedream, port it across using the BBC link software and load it into View Professional".

"The Z88 is surprisingly easy to connect to the outside world – it simply has oodles of RAM disc (up to three megabytes) which can be plugged into the machine".

Need we say more? The Cambridge Z88 – a very special computer. Our Managing Director likes it so much that, he uses it!

Price: **£250** (carr £4)

FREE

As an introductory offer, we are giving 4 Rechargeable Batteries absolutely FREE with every Z88 Micro, purchased from us this month.

ACCESSORIES

Mains Adaptor	£8.65
32K RAM Pack or EPROM Pack	£17.35
128K RAM Pack or EPROM Pack	£43.40
Z88 BBC Link	£21.70
Z88 PC Link	£21.70
Z88 EPROM ERASER	£34.75
Serial Printer Cable	£8.65
Parallel Printer Cable	£24.00
Z88 Modem	£86.90

Continued →



We stock a range of monitors to suit all needs. Choice of a monitor is a matter of personal taste so we recommend that whenever possible, you ask for a demonstration at our shop. **All Monitors are supplied complete with BBC connecting leads FREE.**

MICROVITEC 14"

- 1431 – Medium resolution as used on the BBC television computer programme £175
- 1451 – High resolution, suitable for word processing in mode 0 £225
- 1441 – High res, exceeds the capabilities of the BBC micro £359
- 1431AP RGB + PAL and AUDIO £199
- 1451AP RGB + PAL and AUDIO £255
- **2030 CS 20" Med Res £380**
- **204 CS 20" Hi Res £675**
- Dust Cover for Microvitecs £5.50
- Touchtec 501 Touch Screen £239

SPECIAL OFFER

This month, we are giving away absolutely FREE, our 14" Swivel Base unit worth £16, with every 14" Microvitec Monitor purchased from us.

KAGA-TAXAN 12"

- TAXAN Super Vision 2 **Type 620** Hi-res RGB Colour monitor. Ideal for Wordprocessing £269
- **TAXAN Super 3, Type 625** Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue £319

Philips BM7542 12" Paper White Monitor £75

STAR BUY

- **PHILIPS 14"** Hi-Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono connectors. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display

ONLY £199

ZENITH

"Test Bureau Recommended for use in Education"

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. (These are the same professional quality, stylishly finished monitors as used in the larger Zenith PC Systems.)

Green (New Design) Hi-res	£69
Amber (New Design) Hi-res	£74
LEADS	
BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for KAGA	£3

N.B. carriage on Monitors **£7** (securicor)

SWIVEL BASES

for Video Monitors

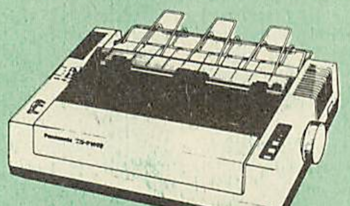
By placing your monitor on one of our superb swivel bases, you gain the freedom to adjust the monitor viewing angle to suit your needs. By doing this, you alleviate eye strain and reduce back stress. Our professional type swivel bases have front adjustable control. This alleviates the need to lift the monitor when adjusting the viewing angle.

for 12" Monitors **£10** (carr. £2.50)
for 14" Monitors **£14** (carr. £2.50)

Anti-Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. Hundreds of these screens are in daily use in various branches of one of the leading High Street banks. **£12**

Panasonic KX-P1081



Available NOW at a superbly realistic price, the KX-P1081 perfectly balances features, quality of construction and Value for Money to produce the printer of tomorrow, here today, ready to sweep the current generation of machines away.

Ingenious innovation in terms of software control codes permits great flexibility when it comes to defining the print style. A nippy **120 cps** of clear Draft text backs up the crisp 24 cps Near Letter Quality text mode, with upto 40 superbly useful downloadable characters. A delightful range of assorted character widths is efficiently supported, with sizes ranging from a broad 5 cpi to petite 17 cpi, EVEN in NLQ mode. Some of the extensive support for serious use includes specialised functions to perform justification, centering and even left and right ranging. Proportional spacing permit even greater freedom when it comes to advanced use. Not only is the full Epson RX compatible control code set implemented, but extra codes have also been added to cater for the NLQ options, etc.

A full 96 ASCII character set is supported, with an extended set of 32 international characters and IBM special characters as well as IBM block graphics characters. A 1K Print Buffer alleviates much of the wait time normally associated with printing, whilst the bi-directional logic seeking print head takes the quickest route to print as required.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£149** (carr. £6)

Panasonic KX-P1082

To complement the hugely popular Panasonic KX-P1081, Watford Electronics are proud to announce the launch of Panasonic KX-P1082. This superb letter quality printer has all the features of the KX-P1081, plus a draft speed of 160 cps, making it ideal for high through-put users. This is a similar speed to the Epson LX800, but has an adjustable tractor feed built in and all the incredible facilities of the KX1081, such as variable sized NLQ between 5 and 17 cpi. KX-P1082 represents truly outstanding value at only £175, way below the price of its nearest competition. The price includes a FREE Cable & Dump Out 3 ROM.

Introductory Offer: **£175** (carr. £7)

Panasonic KX-P3131 Daisy-Wheel Printer

This low-cost high-performance Daisy Wheel printer is ideal for anyone wishing to produce clear, immaculate letters or reports. It delivers, flawless text at 10, 12 & 15 CPS. Supports proportional spacing. Is Bi-directional: logic seeking. Printing speed: 17CPS. Has 6k printer Buffer. A printer of similar spec could cost a lot more than our ridiculously low price of:

Only **£239** (carr. £7)

FREE 32K extra Printer Buffer with every KX-P3131 purchased from us this month.

VARIOUS PRINTERS & ACCESSORIES

- Brother HR15 RS232 Daisy Wheel **£275**
- Brother HR20 Daisy Wheel **£349**
- Epson EX800 Printer **£399**
- Epson EX1000 Printer **£545**
- Epson FX800 Printer **£295**
- Epson FX1000 Printer **£405**
- Epson LQ800 Printer **£358**
- Epson LQ1000 Printer **£529**
- Epson LQ2500 Printer **£790**
- Epson LX800 Printer **£180**
- Epson SQ2500 Printer **£899**
- Epson Paper Roll Holder **£17**
- EX800/1000 Colour Option **£55**
- EX800/1000 Colour Ribbon **£18**
- EX800 Cut Sheet Feeder **£130**
- EX1000 Cut Sheet Feeder £195
- FX/LQ/LX800 Single Sheet Feeder **£135**
- FX/LQ1000 Single Sheet Feeder **£169**
- Hi-80 Refills – Set of 4 Pens **£7**
- LX800 Cut Sheet Feeder **£75**
- LQ800 Tractor Feed **£44**
- LQ1000 Tractor Feed **£50**
- LQ2500 Cut Sheet Feeder **£195**
- LX1000 Cut Sheet Feeder **£305**
- **Hitachi 672 Colour Plotter £495**

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	£27	RS232 + 2K Buffer	£55
IEEE 488	£65	RS232 + 8K Buffer	£75

KAGA/TAXAN PRINTERS

(IBM/Epson compatibles)

Kaga KP815 Printer	**£269** (carr £7)
Kaga KP915 Printer	**£350** (carr £7)
RS232 Interface	£49
RS232 Interface with 2K Buffer	£69
RS232 Interface with 16K Buffer	£89

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

PRINTER SHARERS

(Ideal for School environment)

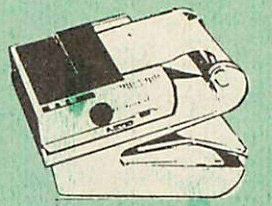
Connects	Serial	Centronics
2 BBC Micros to 1 Printer	£25	£27
3 BBC Micros to 1 Printer	£36	£35
6 BBC Micros to 1 Printer	–	£99

PRINTER CHANGER

3 Printers to 1 Micro (Centronics) **£65**

(Cables extra, specify type required when ordering)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding. **£26** (carr. £2.50)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

PRINTER LEADS

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA, Panasonic etc. printers.

Standard length (4 feet long)	£6
Extra long (6 feet long)	£8
Compact's Special Centronics Lead	£9
RS232 Cable	P.O.A.
IBM Parallel 1 metre Cable	£9

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Brother HR15/20	£3.00	£5.00
EX/LQ800	£7.50	£4.50
EX/LQ1000	£8.00	£5.00
FX80/85/800/MX80	£4.00	£4.95
FX100/1000	£7.00	–
Kaga/Texan KP810/815	£5.25	£4.00
LQ2500	£9.00	£5.50
LX80/86/800	£4.00	£4.50
M1009/GLP	£4.00	£3.75
Panasonic KX1080/81	£4.50	£4.75
SQ2500	£25.00	£5.50
Star NL10	£4.00	£4.50
Microvitec Metal	–	£5.50

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

1,000 Sheets 9½" × 11" Fanfold Paper	£7
2,000 Sheets 9½" × 11" Fanfold Paper	£12
1,000 Sheets 15" × 11" Fanfold Paper	£9
1000 Sheets true A4 Fanfold Paper	£11
2000 Sheets true A4 Fanfold Paper	£20
Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	£5.00
1,000 90 × 36mm (Twin Row)	£4.90
1,000 90 × 49mm (Twin Row)	£7.50
1,000 102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

MEGABUFFER 256



This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Low Cost, High performance.
- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £125 (carr £2)

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

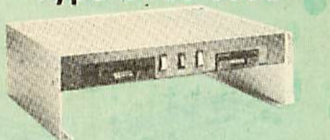
BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

All prices in this advert are exclusive of VAT.

NEW LAUNCH OFFERS

Type DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25 inch disk drive is 40/80 track switchable, and has its very own power supply running independently of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes.

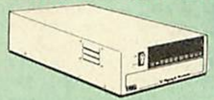
Launch Offer: **£165** carr. £7)

CSPM 400/S DISC DRIVE

A single (1 Megabyte unformatted), double sided, 40/80 track switchable 5¼" disc drive mounted in a BBC Master Plinth (same as DP35-800S) but with a blanking plate to add a second disc drive at a later date. The in-built Power Supply is capable of running two disc drives. The unit is supplied complete with cables and a utilities disc.

Launch Offer: **£139** (carr. £7)

30 Megabyte Winchester Drive



Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

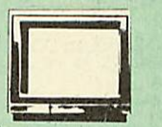
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a full user guide and full utilities including file copy, 1000K save routines, Format and Verify – in fact all you need and more.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along wqith a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBC B (with 1770 disc interface).

Launch Offer **£449** (Carr. £12)

Phillips 12" PAPER WHITE Monitor Type BM7542

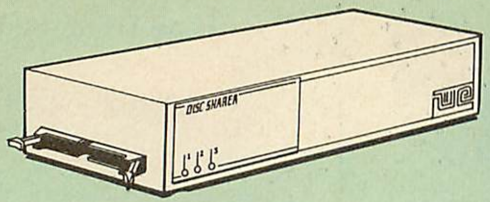


This attractively finished high resolution monitor, has an anti-glare screen and a tilt stand for optimum viewing angle. Its 1000 x 850 pixels resolution coupled with high contrast makes it ideal for both word processing and graphics. The paper white display is especially suitable for desktop publishing and CAD packages. It also has a Video/Audio input.

Only: **£75** (carr. £7)

NEW

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not compatible with ADFS.)

Launch Price: **£59** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for five years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS). (not Acorn's 1770 DFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£46**
- *Acorn's 0.90 DFS Kit complete* **£45**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95** *(P.S. Our comprehensive DFS Manual covers both Acorn & Watford DFSs).*
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics and their appointed dealers only. Every ROM carries a special label with LOGO and serial number.*

NEW WATFORD's Mk II Double Density DFS INTERFACE

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our MkII DDFS board has been adapted to allow the use of Acorn ADFS.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

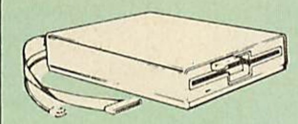
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

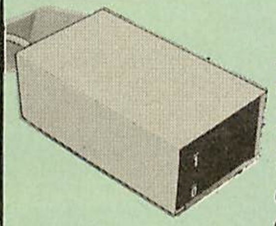
SPECIAL DISC DRIVE/DDFS OFFER

Type CLS400



- The popular Mitsubishi 400k Single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's popular DDFS Disc Interface (allows 720k storage). Will run in both Single and Double Density modes 40/80 track Software switchable.
- A comprehensive User Friendly Manual.

A Bargain at Only **£130** (£6 carr)
(Offer valid while stocks last)



3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- Single 400K Drive **£69**
- Twin 800K Drives **£126**

MYSTERIES OF DISC DRIVES & DFS REVEALED (BOOK)

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

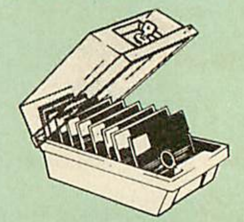
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£7

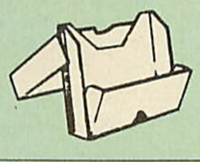
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.



- **M35** - holds upto 50 5¼" discs **£6.00**
- **M85** – holds upto 95 5¼" discs **£8.00**
- **M25*** – holds upto 25 3½" Discs **£5.50**
- **M50** – holds 50 3½" Discs **£7.50**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.

Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.



Protection at Only: **£2**

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

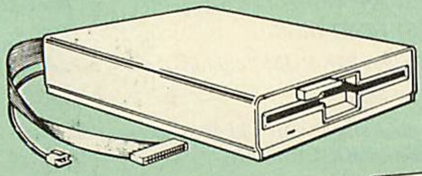
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

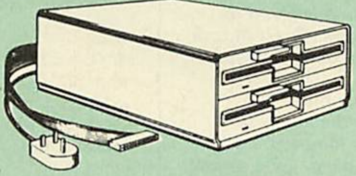
If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.





Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £98	
400K (720K)	CLS400S £89	CLD 400 £168	CS 400S £99	CD400 £188
800K (1.44M)		CLD 800S £169		CD 800S £188

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes* ***£8.25***
- *10 × 5¼" D/S D/D 40 Track Diskettes* ***£10.20***
- *10 × 5¼" S/S D/D 80 Track Diskettes* ***£12.75***
- *10 × 5¼" D/S D/D 80 Track Diskettes* ***£13***
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£28***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£15***
- *10 × 3½" D/S D/D 40/80 track Discs* ***£19.50***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 × **M3** 3½" D/S D/D 80 Track Discs* ***£18***
- *10 × **M4** 5¼" S/S D/D 40 Track Discs* ***£6.50***
- *10 × **M5** 5¼" D/S D/D 40 Track Discs* ***£8***
- *10 × **M7** 5¼" D/S D/D 80 Track Discs* ***£9***
- *3" Double Sided Discs* ***£3 each***

Special BULK OFFER on 5¼" DISCS

PRICES SLASHED

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

ACORN WINCHESTER DRIVES

FILESTORE E01	£825
FILESTORE E20	£705
Acorn 30MB Unit incl. Level III Software	£1520

WATFORD's WINCHESTER DRIVES

PRICES SLASHED

- 10 Megabyte Unit with ADFS **£399**
- 30 Megabyte Unit with ADFS **£449**
- 40 Megabyte Unit with ADFS **£749**

CDP800S **CDPM800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

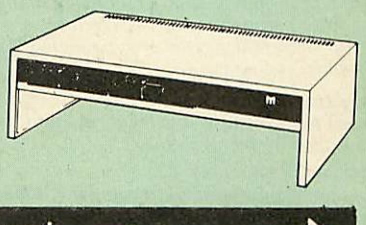
CDP 800S for BBC Micro £192
CDPM 800S for Master £196
(Securicor Carr. £7)
(The above drive units are 2 Megabytes unformatted)

ACORN'S Twin 800K Disc Drives

Specially mounted side by side in a Master Plinth. Supplied complete with Cables. Plugs directly to the Master Computer.

RRP ~~£350~~

Our Price: Only £182
(carr £7)



Continued →

NOMINATED FOR
MICRO COMPUTING BRITISH AWARDS
1987

QUEST MOUSE

QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and is smooth and easy to use on most work surfaces. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package
With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87
"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."
"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87
"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87
". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package. . ."
". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."
"What we have here is probably the best art package there is for the BBC Micro . . ."
"Quest Paint is a major leap forward in BBC programming. . ."
"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87
"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest . . ."
". . . this package represents excellent value for money. If you are interested in art then this program is for you to buy".
"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".
"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".
"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".
"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".
"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus . . ."
"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".
"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program".
The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:
"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Cln. C.G. Holton, G2 HQ 1 (BR) Corps, BFPO 39, writes:
"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:
"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem".
"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".
"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- Pick filenames off the screen for loading and saving.
- Rotate a cutout to any angle and Distort it to any four sided shape.
- Has Built in Font editor.
- Default brushes and patterns on startup.
- 16 x 16 font available on start up.
- Ability to reset patterns, fonts and brushes to default at any time.
- ROM based enhanced Epson and compatible printer dump.
- ROM based enhanced extended picture routine.
- Ability to create and abort extended pictures.
- Improved disk access speed for extended pictures.
- User definable sideways RAM driver for incompatible sideways RAM systems.
- Ellipses at any angle on Master 128 (or B with GXR ROM).

QUEST MOUSE & QUEST PAINT	**£59**
QUEST MOUSE, QUEST PAINT, AMX PAGEMAKER & PAGEFONT	**£85**
QUEST MOUSE ONLY	**£29**
QUEST PAINT SOFTWARE	**£32**
QUEST FONT DISC	**£12**
ConQuest 32K ROM Package	**£29**
QUEST MAT	**£3**
Part-exchange your old Mouse for a New QUEST MOUSE for only	**£23**

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £19
(Price includes software on Disc)

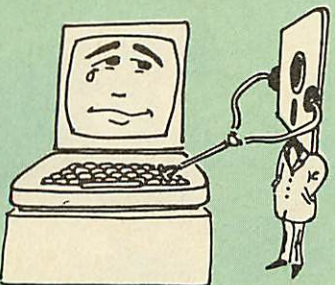
RB2 Marconi Tracker Ball

RB2 (AMX/Quest compatible)	£59
RB2 including Quest Paint	£85

FLEET STREET EDITOR

Software pack for BBC Micro	£31
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

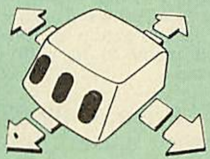
DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

THE AMX MOUSE



ONLY: £59 Inc. Super Art package
(carr £1.50)
(Please specify for BBC, Master or Compact)

FREE our popular Colour Art software pack worth £15 with every AMX Mouse package purchased from us.

AMX MAT	£3
AMX MOUSE ONLY	£29
AMX DESK Package	£19
AMX UTILITY Package	£11
AMX SUPERART Package	£39
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse	£32

We are giving away absolutely FREE, our PAGE-FONT disc with every purchase of STOP PRESS from us.

PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£9.50
AMX DESIGN (ROM)	£59
AMX 3D ZICON Disc	£19
AMX Database Disc	£19
AMX XAM Educational	£15
AMX MAX A gem of desktop (ROM)	£15

TED

THE ULTIMATE TELETEXT SYSTEM

TED is one of a new generation of powerful 32K ROMs for the BBC B, B+ and Master computers and is compatible with disc, tape and network systems. It is in everyday use in schools, colleges and universities, Programmers, Prestel I.P.'s, Micronetters and exhibitors have also found it indispensable.
TED includes the most comprehensive teletext (Mode 7) screen editor ever written for the BBC micro, combining flexibility with ease of use. Its sophisticated facilities include line, column and block copying within AND between frames; text, in a variety of styles and sizes, entered directly from the keyboard; graphics and line drawing modes; search and replace; margins; printer dump routines and a library of in-built icons and typefaces. TED will edit ANY mode 7 screen and can even convert high-res graphics screens to mode 7! Included within the ROM is a fully Epson compatable mode 7 graphics dump routine giving a grey scale printout of exactly what appears on the screen.
Using '*SHOW' (a versatile carousel), collections of mode 7 screens may be 'routed' or displayed sequencially, making it ideal for creating and running 'Viewdata' information systems. Over 1200 frames may bestored on a twin 80 track drive. A unique feture of TED is '*SCROLL', which lets you create pages of up to 600 lines which may be viewed 'Wordwise style', automatically or manually. SHOWs and SCROLLs may be freely mixed and even used from within a BASIC program.
The package comprises a 32K ROM, a 117 page manual, a function-key strip and a demonstration disc containing examples of real-time animation and a sample 55-frame database. A stand-alone machine code routine is provided allowing SHOWs and SCROLLs to be displayed on machines not fitted with TED.

Price: £35

ROM-SPELL

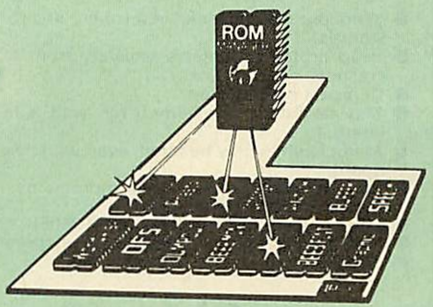


Probably the most advanced and fastest spelling checker available for the BBC Micro. Compatible with View, Wordwise and Wordwise Plus ROMSPELL is simple to use with easy editing of incorrect words. Full facilities for editing the user dictionary to allow customisation to your personal needs. Dictionary includes over 30,000 words and is supplied with a Comprehensive manual.

NOT compatible with 1770 DFS.
(Please state 40 or 80 track disc)

Price still only: £25

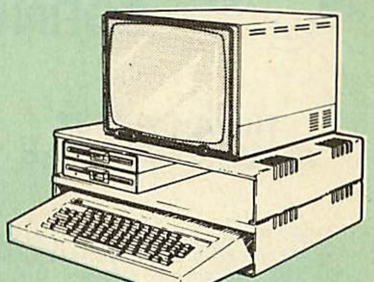
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

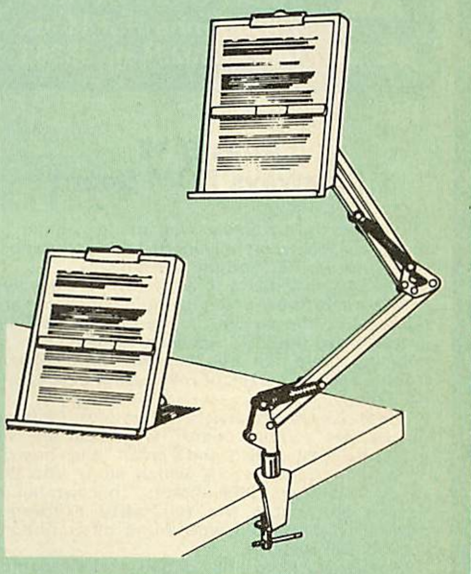
PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£19** (carr. £3.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£24** (carr £3.00)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.
Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a plastic retaining ruler and a clip grip. Both units are full A4 size.

Amazing value at only
Desk Top **£10** (carr. £2)

Angle poise **£14** (carr. £3)

Continued →

ARIES CORNER

The Aries B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: **£80** (carr. £2)

CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

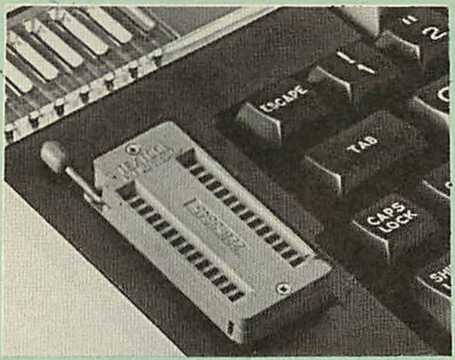
Price:		
	Aries B-12	**£40**
	Aries B-12C	**£5**

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack.

Complete System	**£11**
Spare Cartridges	**£2.50**
Spare Rack	**£1.50**

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.

Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

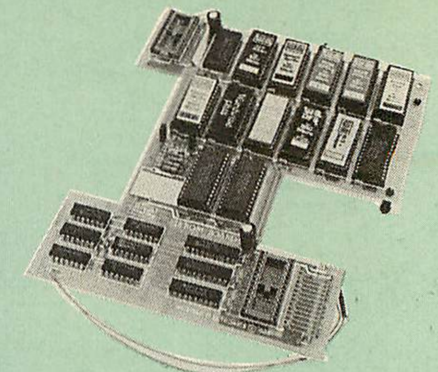
Only: **£24** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

All prices in this advert are exclusive of VAT.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

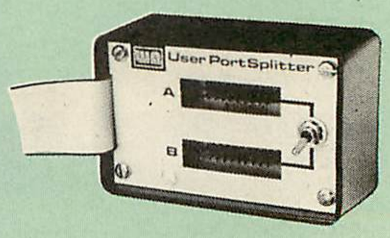
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

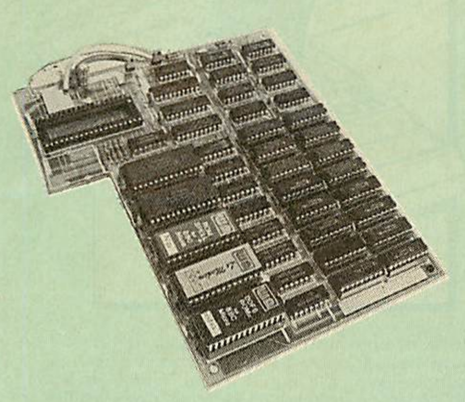
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£19**

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- *ROM/RAM card with 32k dynamic RAM* ***£39***
- ROM/RAM card with 64k dynamic RAM ***£52***
- ROM/RAM card with a massive 128k dynamic RAM ***£80***

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- *16k plug-in Static RAM kit* ***£6***
- *16k Dynamic RAM for Upgrade* ***£7.50***
- *Battery backup* ***£3***
- *Read and Write protect switches* ...... ***£2 each***

Complete ROM-RAM board All options installed ***£89***

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £10 less

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***

SPECIAL OFFER

Price: ***£84***
(carr £3)

(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

£82

(Price includes: Nightingale Modem, Commstar ROM pack & Comprehensive manual)

Nightingale Modem without software **Only £75**
COMMSTAR ROM package only **£29**
(P&P on modem £3.00)

APOLLO

The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**
- **£6.50 off annual Membership to Micronet, Prestel and Telecom Gold.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£84** **(Carr £3)**
Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)

Minerva Systems Software

System Delta with Card Index	£55
System Programmers Ref. Guide	£19
System Gamma	£43
System Gamma Prog, Ref, Guide	£19
System Mailshot	£17
System Reporter	£17
System Intrer/View Link	£17
System Sales Ledger	£39
System Purchase Ledger	£39
System Nominal Ledger	£48
System Stock Management	£39
Order Processing/Invoicing	£39

Versatile **BEEB SPEECH SYNTHESISER** Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£25
DISC DOCTOR	£28
Graphics ROM	£23
TERMI	£25
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£24

Wordwise £24

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £45

Inter SHEET ONLY £37

INTER CHART ONLY: £26

Inter-WORD

Only: **£39**

INTERBASE £55

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£79**
HI-VIEW (for use with 6502 2nd Processor)	£36
VIEW Printer Driver Generator (Please specify Disc or Cassette)	£9
VIEWSHEET (Acornsoft)	£37
VIEWSTORE	£37
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£22
VIEW-INDEX	£12
OVERVIEW Packs 1 & 2 for the Master	£75

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

Micros in Business (Disc)

An introduction to Business software for the BBC Micro from Acorn £43

ADVANCE COMPUTER PRODUCTS' ROMs

Adv. Disc Toolkit	£29
Adv 1770 DFS for Mast/Compact	£29
Adv 1770 DFS for BBC/BBC+	£29
Adv Disc Investigator	£24
Adv. Control Panel	£29
Adv. Rom Manager	£13

MINI OFFICE II

Disc Version	£14.50
ROM Version	£48.00

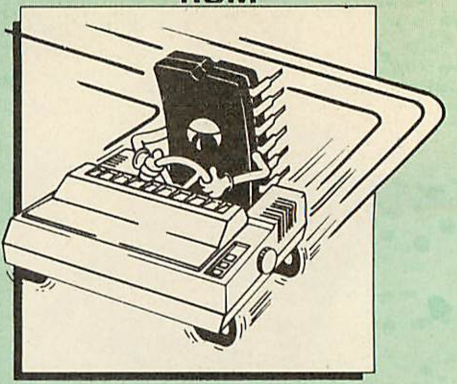
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33



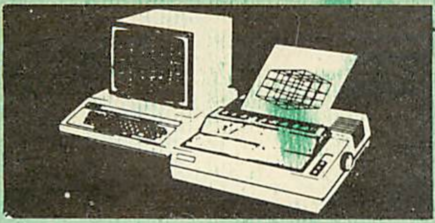
Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- *Vertical and horizontal scaling in all graphics modes and mode 7*
- *Rotation of image by 90, 180 or 270 degrees*
- *Left hand margin setting*
- *Screen dump window setting*
- *Colours appear as grey scale*
- *Two tone fast dump*
- *Colour mask*
- *Mode 7 contrast expansion*
- *Mode 7 contiguous dump*
- *Key triggered and User Port triggered dumps*

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1080, Mannesman Tally and compatibles.

Only: £25

(Write in for further details on all above ROMS)

THE EUREKA CARD

(The Unique RAM Expansion System)

The Eureka Card is Watford's latest and most sophisticated RAM expansion system. Using advanced PAL based technology this card is a breakthrough in RAM systems for the BBC micro. The Eureka Card provides the user with around 58K of free memory in Basic, VIEW and WORDWISE PLUS. You also get Shadow RAM from within the active language. No other RAM expansion system can match that!

Load up to 58K long Basic programs. Texts in VIEW and WORDWISE PLUS up to 58K as well. This with absolutely NO loss of speed in accessing your text or program. Eureka consists of a card containing 64K of program memory, two parallel banks of sideways RAM and some extremely complex switching circuitry. This is all controlled by Eureka's highly sofisticated software supplied in ROM. Designed to a very high specification, this board is fully buffered to give reliable operation under virtually any circumstances.

The Eureka board plugs into the 6502 socket and has NO messy flying leads. It is compatible with many other products from Watford, such as our Solderless ROM Board and our ROM/RAM Board. All in all, the Eureka Card is an amazing board. Jump into the age of serious data processing with a Eureka Card! Please write in for further details 'on advantages the Eureka can offer you'.

Introductory price: Only **£89** (carr £3)

(P.S. Eureka is only suitable for a standard model B; it normally replaces any Shadow RAM cards present. Some speed degredation does occur with filing system access. Eureka cannot be used at the same time as a second processor).

BEEBMON

The most powerful machine code monitor for the BBC Micro **£24**.

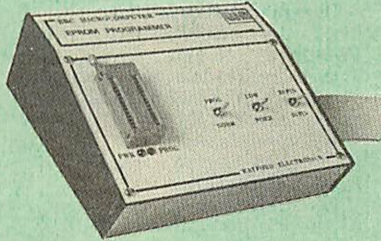
THE NLQ DESIGNER

(The First & still the Best)
Supplied with over 25 Different fonts

A massively useful utility for users of the Taxan/Kaga KP810/910 or the Canon PW1080. This program allows you to define NLQ character sets to download into the printer's memory. Full on screen editing of the font. Requires 6264 RAM chip to be fitted in the printer.
Supplied with disc containing over 25 example fonts. (Please specify 40 or 80 track when ordering.) Fonts are: Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print and Gothic etc. (P.S. This ROM is not suitable for Epson printers.)

- NLQ Designer ROM, FONT Disc and Manual **£25**

ADDER



Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£75 (£3 Carr)

TEX EPROM ERASERS

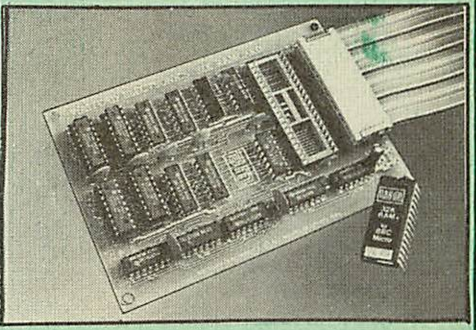
EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

32K

SHADOW RAM-Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

Continued →

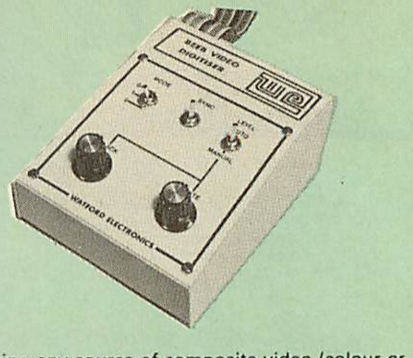
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BEEB
VIDEO DIGITISER



Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

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(As seen on TV)
A combination of the AMX Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within AMX Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

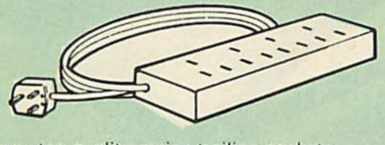
Complete Package **£129.00** (carr. £3)

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BBC to Disc Drives Ribbon Cable

Single **£4** Twin **£6**

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Badger Micros (Devon), Badger's Hill, Southerton, Ottery-St. Mary, Devon EX11 1SE. Tel: 0395 68516.

Beebug Retail, Dolphin Place, Holywell Hill, St. Albans.

Cambridge Computer Store, 4 Emmanuel St., Cambridge CB1 1NE. Tel: 0223 358264.

Cirkit Distribution Ltd. Park Lane, Broxbourne, Herts.

C.J.E. Micros, 78 Brighton Road, Worthing, West Sussex. Tel: 0903 213361.

HCCS, 575-583 Durham Road, Low Fell, Gateshead, Nr. Newcastle Upon Tyne. Tel. 091 4870760.

Mancomp Ltd, Printworks Lane, Levenshulme, Manchester. Tel: 061-224 1888-9888.

Microman Computers, Pasture Lane Farm, Pasture Lane, Rainford, St. Helens, Merseyside WA11 8PU. Tel: 074488 3667.

The Computer Depot, 205 Buchanan Street, Glasgow G1 2JZ. Tel: 041-332 3944.

Verospeed Ltd, Boyatt Wood, Eastleigh, Hants.

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*Absolute Electronics, Rewal House, 208-210 La Trobe Street, Melbourne, 3000, Victoria, Australia. Tel: (03) 663 2411.

Alpha Computer Co, Shop 314 Chi Fu Commercial Centre, Chi Fu Fa Yuen, Hong Kong, Tel: 5-506592.

Computer Distribution Company, Parklaan, 47, 8-9300 Aalst, Belgium.

E.B.N., Elisenstrasse 13, 1000 Berlin 41. Tel: (030) 7952057

Lendac Data Systems, Unit 31, IDA Enterprise Centre, Pearce Street, Dublin 12. Tel: 710796.

Scientex P.V.B.A., Zilversmidstraat 2, B-2000 Antwerpen, Belgium, Tel: 03 233 59 06

Techno-matic Data, Holbergsgade 19, 1057 Kobenhavn K, Denmark

*Velobyte, Scheaedyksadyk 5a-6a, 3011 EB Rotterdam, Holland, Tel: (010) 413 8197/414 5171.

Viking Tecno, Vestergade 12.1, 9620 Aalestrup, Denmark, Tel: 08 642522

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£2

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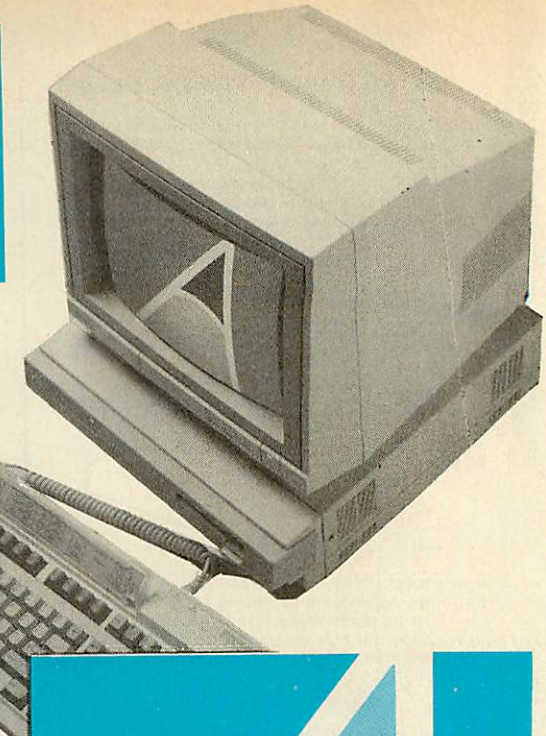
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RISC USER is written by an experienced team of Archimedes enthusiasts with roots in education, home computing, and over 5 years experience with the BBC Model B and Master computers with BEEBUG magazine. So popular is BEEBUG that membership exceeds 20,000 worldwide.

RISC USER provides lively and informed coverage of what's happening in the world of the Archimedes. Reviews, hints, programs and articles are specifically written for the Archimedes, showing how to exploit the many features of this sophisticated computer. RISC USER has material of direct use to education, business, industry and home computing.

RISC USER includes a well balanced selection of the latest news from Acorn and other major suppliers, pre-release reviews of the latest software and peripherals, as well as editorial features, ideas, hints and tips, readers letters and much more. RISC USER is published 10 times a year and is only available on subscription.

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AU2

STYLE COUNSEL

Clear, legible listings are the hallmark of a good programmer – and it can help get your work published

Graham Bell

Why is style important? If you make programs comprehensible others can make use of them, alter and maintain them, and learn from them. This is even more important in two areas – commercial programs which may have to be maintained by different people over a period of years, and in magazine listings, where typing in and debugging must be made simple.

An important aspect of good style is to make the listing as easy to read and as consistent as possible so that it is easy to find mistakes.

BBC Basic is well suited to sensible programming style. Apart from structuring, the ability to use long, meaningful names for variables, procedures and functions helps; you can give parts of the program names that reflect the their function. You can name quantities according to what they mean. But this doesn't go far enough; there are some other rules that can help make the listing legible and the structure more obvious.

The requirements for a printed listing may be different from those of a program you write yourself. The *Acorn User* style tries to make a listing simpler to type in without making many mistakes.

A point that should be stressed with printed listings is the use of meaningful variable names. It is simple to get a single character wrong; typing 'i' instead of 'l' for instance. But it is easier to spot your mistake if it is inside a readable word; like 'ioop' instead of 'loop'.

Of course, that makes the programs longer. This is rarely a problem with magazine listings, as they are already limited in length by other factors. It also makes the programs slower. Again, the



first priority for a magazine listing is that it works. Speed is usually secondary.

Programs for *Acorn User* should always be written to conform with the style of the programs in the yellow pages. Most aspects of this are simple to see. For instance all programs start with a few REM lines giving details of their function, their author, and a brief guide to what machines they should run on.

Other aspects of the standard style are less easily noticed, such as the number of spaces. Spaces are vital to make a program readable. The *Acorn User* style is to put a space after all keywords, unless there is some other non-alphabetic character there already. So the rule is 'MODE 7', not 'MODE7'. But of course, lack of memory can prevent you putting in as many spaces as are desirable.

In a magazine, the line length of the printed listing is important. Programs on the yellow pages are printed using a width of 40 characters, or 24 characters when there are three colums of listing on the page. You can set this on your own micro by typing:

```
MODE 3
LISTO 1
WIDTH 40
```

This should make any listing you have typed in look exactly the same as the printed version. To help find typing errors, it can be useful to do this and compare the length of the lines.

Some program lines get split into two, as they are more than 40 characters long. Care is taken to ensure that vital spaces don't appear at the beginning or end of a long program line that breaks over two lines of the magazine. For example:

```
   10 PROCosc("SAVE DATA
 3000 +100")
```

is more difficult to type in correctly than:

```
   10 PROCosc("SAVE DATA
 FIL 3000 +100")
```

because the program requires a space character immediately before the '3000' to work, yet this space is not obvious in the first version of the line.

Integer variables should be used wherever possible. This advice is often given because integer calculations are quicker, and because integer variables use up less memory than real numbers: they are stored in four rather than five bytes. But the % sign at the end of the integer variable name immediately uses up that extra byte, and because you always use a variable name more than once, you end up using more, not less, memory with integer variables! But integers are better for other reasons; you don't get rounding errors:

```
10 count=0
20 REPEAT
30 count=count+0.1
40 UNTIL count=6.1
50 VDU 7
```

It looks as though this program goes around the REPEAT loop 61 times. But if you type it in and run it, the computer will never beep – it's an infinite loop. This is because computers cannot store some fractions exactly; they work to a limited preci-

Archimedes

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A computer like ARCHIMEDES needs software that can match its outstanding capabilities. Our new products do just that and one of the first areas that you will want to explore is the graphics capability. ARTISAN, from the authors of ARTROOM, is the ultimate in graphics packages. Just take a look at the screen shot reproduced here, as they say 'a picture is worth a thousand words'. We can't describe all the features here but some major functions are:

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PICTURE THIS

—COMPETITION—

Can you do better than the picture shown here? If so you could win yourself a unique prize. If yours is judged to be the best picture then your masterpiece will be transferred to canvas by our artist Jon Warmisham (BA Hons Fine Art). The competition is open ended but the best picture each month will be featured in ACORN USER and a monthly prize will be awarded. Full details are contained in the ARTISAN pack.

Alpha-Base

Alpha-Base is the successor to the hugely successful Beta-Base, the top selling database for the BBC micro. Beta-Base files can even be transferred to Alpha-Base.

Alpha-Base incorporates all the suggestions and requests that we have received over the last five years. All of the standard Beta-Base facilities are there but in a much improved form. In addition there are many new features that will make your life easier. Some of the features are:

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- Multiple display & entry forms
- Fast search & sort options
- Plain English entry of search criteria
- Five data types including formula & date
- Winchester compatible

At Clares we try to give you usable programs. This results in some arbitrary limits on the size of files in Alpha-Base. The limits of 400 fields and 27,600 characters per record are unlikely to restrict you but they enable us to save memory and provide additional features. The only other limitations are due to the hardware. Alpha-Base can handle 2.14 billion records but the ADFS can't!

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IMAGE WRITER is a sophisticated WIMP based wordprocessor with the ability to include graphics as well as to use various font combinations. Because Image Writer is document based you do not have to create page layouts for every page. You prepare your whole document in one go. Just type it, add the graphics and print it—simple. The graphics can be created with the built in graphics editor. Image Writer is designed as a first level DTP product and it uses the normal printer fonts to print both text and graphics in one pass. We will of course be producing a full feature DTP when ARCHIMEDES supports the fancy font printing. Image Writer will be available when you read this so please contact us for more information.

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ATM is the first toolkit available for this powerful new micro. Many of the features that made RAMROD a top seller have been incorporated into ATM and a whole host of new features have been added including:

- 10 Memory and disc editors
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- Catall and Exall for discs
- Winchester compatible

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sion. So each time you calculate something using real numbers – or decimals – you run the risk of a rounding error. And in this case, the errors mount up so that the 'count' variable never equals exactly 6.1. So the *UNTIL* condition is never true.

Using integer variables has a second benefit. There is less likelihood of problems with statements like:

```
start=1:end=5
FOR loop=startTOend
```

This will cause a 'No such variable' error, because the computer thinks 'startTOend' is a variable name.

It is easier to read a listing if it has one statement per line. This is a general rule, but there are exceptions. Because BBC Basic can't use multi-line IF statements, you may have to put several statements on the same line after IF. But where the line gets too long, remember you can always use a procedure instead:

```
IF true% THEN PROClong
```

The statements you would have joined together on the long line can all go in a single procedure. This makes the line more readable, and allows you to use an ELSE statement too.

One construction to avoid is IF with a secondary IF:

```
IF true% THEN PROCone
 ELSE IF instead% THEN P
ROCtwo
```

This is very confusing, and can be expressed in another way more clearly:

```
IF true% PROCone
IF (NOT true%) AND in
stead% THEN PROCtwo
```

This also illustrates the *Acorn User* rule about the use of THEN. It is rarely necessary, and often can be omitted. But where the condition is complicated, then it is clearer to use THEN, as it marks the end of the condition unambiguously.

Programmers often can misuse the INSTR keyword; this does not return a TRUE or FALSE result. So:

```
IF INSTR("Yy", ans$)
THEN...
```

is wrong. In fact this works, but only because the numerical value of FALSE is zero. It's better to use:

```
IF INSTR("Yy", ans$)
<>0 THEN...
```

Another quirk of BBC Basic is the use of the PRINT keyword. Items after PRINT form the print list, and parts of the list may be separated from each other using punctuation marks: apostrophes, commas or semi-colons. But in some cases, a separator isn't necessary – you don't need commas between successive strings for example. In other languages, all items in the list require separators, so it's best to include them in BBC Basic too.

It can be very difficult to modify a listing for different hardware, and printers are often the biggest source of trouble. One idea which can aid the conversion is to use constants. These can be set at the start of the program, like this:

```
 60 REM print control
 70 reset$=CHR$ 27+"@
"
 80 crlf$=CHR$ 13+CHR
$ 10
 90 form$=CHR$ 12
100 pitch$=CHR$ 27+"A
"+CHR$ 8
110 graphics$=CHR$ 27
+"L"
120 dot%=960
```

You can then print these strings at the necessary points in the program, for example to cause a carriage return and line feed. Sending a string to the printer can be done with the procedure PROCel print:

```
DEF PROClprint(str$)
*FX 3,10
PRINT str$;
*FX 3,0
ENDPROC
```

The advantage of setting up constants is that if you have a different printer using different control codes, then it is simpler to change these contants once than several lines scattered around the listing.

Constants like this have to be set up at the start of the program so that they can be used by any part of the following code. That is, they have to be global variables, in existence throughout the run of the program. The other sort of variable is a local variable – one that only exists within a procedure, and disappears when the procedure ends. These are set up like this:

```
DEF PROCinvert
LOCAL x%, y%, z%
```

Within procedures and functions declare all the variables used as local unless they really need to be global – that is unless they have to carry information back to the rest of the program. Making variables local simplifies matters when you modify a program, as you know that with local variables, any changes you make are limited to a single procedure. Even if there is another x% somewhere else, it won't be affected by your procedure.

The structure of a program is important as well as the details of the listing. This structure should be reflected as much as possible in the listing. Procedures and functions are used to break down a program. Well structured programs are designed by breaking down the problem into a series of small steps, each of which can be tackled independently. These might need to be broken down again into subproblems, each of which can be reduced to a procedure or function call. The main program should link these procedures together to solve the overall problem.

Reading a listing with, say, 20 procedures is difficult, as at each stage you have to find the procedure in the listing. Putting the procedure definitions in some logical order is the only way to make this simpler to understand. For example, if a function is only used once, say within another procedure, then the smaller function should appear in the listing immediately after its 'parent'. Where routines are used at several points within a program, then the body of the routine should immediately follow the point where it is first used.

Another option would be to put all function and procedure definitions is alphabetical order, but the first method shows the hierarchical nature of the program better. In many other languages, for example Pascal, any functions used exclusively within a larger function must have their definition actually inside the definition of the parent.

Some often-used functions could usefully be stored in a 'library' and tacked on at the end of the listing. Such routines can be appended to an existing program as described in the box.

LIBRARY ROUTINES

You can keep all your library routines in separate files – just normal Basic programs, but with line numbers starting at 10000. One file might look like this:

```
10000 DEF FNequb (num%)
10010 ?P%=num%
10020 P%=P%+1
10030 =pass%
```

This can be merged with an existing program in the following way. First, with the big program in memory, type:

```
PRINT ~TOP-2
```

This displays a hexadecimal number, which you don't need to understand. Now load in the library file using:

```
*LOAD <file> <hex>
```

using the name of the library file and the hexadecimal number. Finally type OLD and RENUMBER. Basic 5 on the Archimedes has an APPEND command to do just this.

PINEAPPLE SOFTWARE

Programs for the BBC model B, B+, Master and Master Compact with disc drive

DIAGRAM II – also available for Archimedes

Diagram II represents a major breakthrough in the techniques used for drawing software on the BBC micro. It works on a completely different principle to other drawing software by storing the drawing information straight to disc as coded 8*8 pixel blocks.

This technique has three major advantages. First, the size of the diagram is only limited by the amount of space on disc. Second, there is no limit to the amount of information which can be stored on a given diagram as the information is stored on disc and not in computer memory. Third, the disc storage technique allows the smooth scrolling of the screen over the whole surface of the diagram.

For people not familiar with Diagram, the basic operation of the program is to first display any part of the diagram, either by quoting an index name or screen number. At this point you are free to scroll the diagram around the screen using either cursor keys, trackerball or mouse. You may stop scrolling at any point and enter the edit mode which allows you to modify or add new information to the diagram. When you have finished making alterations, the new information is stored to disc and you are free to scroll elsewhere on the diagram stopping to edit at any time.

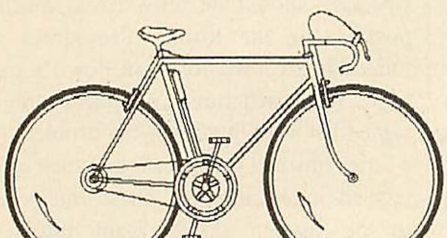
The edit features are now very comprehensive. Text may be typed straight from the keyboard, and if other fonts are stored as user defined characters then these fonts may be printed using the normal keyboard keys.

The print routines are now completely 'scaleable' with both the horizontal and vertical scales being totally variable in 1% steps between a size that will give 18 mode 0 screens on an A4 sheet and a size that would print just one pixel on a sheet! The routines are adaptable to most types of dot matrix printer and full advantage may be made of wide carriage printers. The printouts may be rotated through 90 deg. if required.

The new editing features make DIAGRAM II suitable for all types of serious drawing application including scale drawings, flow charts, architectural, family trees, and many other subjects as well as circuit and schematic diagrams. As an example of what Diagram II can do, this complete advertisement (with the exception of the PCB drawing) has been produced with the package.

SUMMARY of DIAGRAM II FEATURES

1. Works on any model BBC computer with either DFS or ADFS. (ADFS only if Shadow memory available).
2. Will automatically take advantage of shadow memory (any make) to provide more User Definable Characters, 880 with Shadow, 381 without Shadow.
3. Rapid horizontal and vertical line drawing routine with automatic joins for circuit diagrams.
4. Full rubber band line drawing and circle drawing modes.
5. Takes advantage of the Acorn GXR rom to provide drawing of arcs, sectors, chords, parallelograms, ellipses, and flood filling. Note this rom is already fitted to Master and Compact machines.
6. Pixel cursor drawing and deleting mode allows very fine detail to be added.
7. Defined areas of screen may be moved, copied, deleted or saved to disc.
8. On-screen indication of cursor position shows either the cursor position on the overall diagram or the distance from a preset point.
9. Keyboard keys may be predefined to print User Defined Characters, enabling new character sets to be stored as user defined characters and then printed straight to the screen using the keyboard keys.
10. Wordprocessor files may be loaded to the screen and automatically formatted into any shape screen area.
11. Index names may be set up to point to given areas of a large diagram, to enable rapid access to a given point on a diagram.
12. Fully compatible with Marconi trackerball and most makes of mouse.
13. All Diagram 'Utilities' are included, enabling screen ident numbers and borders to be added, and any area of diagram to be moved or copied. The whole diagram may be displayed in reduced scale (either 4*4 or 8*8 format) on a single screen, and the size of the overall diagram may be increased or decreased.
14. Completely scaleable print routines allow any area of the diagram to be printed either horizontally or through 90 deg. in scales that may be varied in 1% steps allowing up to 18 mode 0 screens to be printed on an A4 sheet (still with readable text).
15. Complete with 40 page easy to understand handbook.



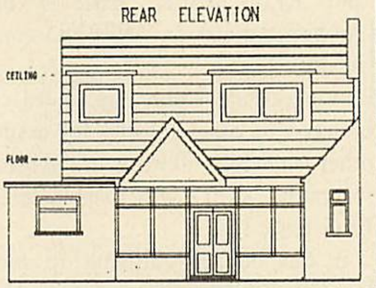


Diagram II consists of a set of disc files and a 16k Eprom. The disc supplied is formatted in 40T on side 0 and 80T on side 2. Please state if this is unsuitable for your system, or if you require a 3.5" Master Compact disc.

DIAGRAM II – £55.00 + vat

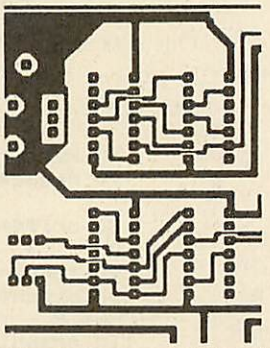
P & P free (except overseas)

N.B. Upgrades are available to existing Diagram owners. Please contact Pineapple if you have not received an upgrade letter.

PCB – autorouting now available

Pineapple's now famous printed circuit board draughting aid produces complex double sided PCB's very rapidly using any model BBC micro and any FX compatible dot-matrix printer.
The program is supplied on Eprom and up to 500 component and 500 ASCII component descriptions may be stored for each PCB. There is no limit to the number of tracks that may be stored for a given PCB although the maximum board size is restricted to 8" * 5.6".
Using a mode 1 screen, tracks on the top side of the board are shown in red, while those on the underside are blue. Each side of the board may be shown individually or superimposed. A component placement screen allows component outlines to be drawn for silk screen purposes and component numbers and outlines entered on this screen may be displayed during track routing to aid identification of roundels.
The print routines allow separate printouts of each side of the PCB in a very accurate expanded definition 1:1 or 2:1 scale enabling direct contact printing to be used on resist covered copper clad board. The print routines are very fast taking typically 5 minutes for a 1:1 print of a 7" * 5" board.
This program has too many superb features to describe adequately here, so please write or 'phone for more information and sample printouts.

PRICE £85.00 + vat



PCB PLOTTER DRIVER

A new addition to the PCB software is the PCB plotter driver program. This enables files produced by PCB to be used in conjunction with most types of plotter to produce plotted output rather than the normal dot-matrix printer output.
In this way plots may be produced directly onto film or even directly onto copper board with an etch resistant pen if a suitable plotter is available. The program is suitable for use with most makes of plotter including Hewlett Packard, Hitachi and Plotmate M. The program can also be configured to work with other plotters by entering suitable plotter instructions.
All the features of the printer driver are included, such as the automatic thinning down of tracks between roundels. Mirror image plots are also available.

PRICE £35.00 + vat

MARCONI TRACKERBALL

This high quality device comes in three versions. Version one is for the standard BBC micro and comes with the Icon Artmaster drawing package from Micro-Draw, and Trackerball Utilities which allow the trackerball to be used with other software.

Version two is for the Master 128 computer and this comes with the Pointer Rom. This is a Rom which allows the Master to be configured for use with the Trackerball and has commands to enable the Trackerball to intercept the cursor key or joystick routines of other software. Commands are also available to reverse the axes of the trackerball and set the sensitivity. The three buttons may also be set up to produce any ASCII code.

Version three is simply the bare Trackerball which comes without software but is suitable for use with specially written software such as Diagram or Diagram II.

Trackerball adapters are also available which plug onto the end of the cable and convert the connections of the trackerball to be the same as a mouse. This enables the trackerball to drive all types of 'mouse' software.

For Model 'B' and B+ (with Icon Artmaster)	£ 60.00 + vat
For Master 128 (with Pointer Rom)	£ 60.00 + vat
Bare Trackerball (no software)	£ 49.00 + vat
Pointer Rom - available separately	£ 12.50 + vat
Trackerball to mouse adapters	£ 8.00 + vat
Postage & packing on Trackerballs	£ 1.75

MITEYSPICE

Miteyspice is a very powerful AC & DC circuit analysis package with graphics suitable for use with any model BBC micro including those with 2nd processors.
As well as all the usual facilities available with this type of program, non-linear effects, small signal, noise measurements and sweeps may be performed. Component values may be swept, allowing component tolerances to be investigated as well as thermal performance etc. Comprehensive transistor modelling is incorporated using a 20 parameter Ebers Moll description. The program is supplied on disc with a very comprehensive 49 page manual.

PRICE £119.00 + vat

ADFS Utilities Rom — ADU

ADU is an invaluable utility for all ADFS users. It adds over 20 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more.
Copying of DFS discs onto ADFS discs can be made in one pass with automatic creation of the required directories on the ADFS disc. All functions are fully compatible with Winchester drives including *BACKUP which allows backing up of Winchesters onto multiple floppies.
Additional *commands include:- *ADU, *BACKUP, *CATALL, *CHANGE, *DFSDFS, *DIRALL, *DIRCOPY, *DIRDESTROY, *DIRRENAME, *DISCEDIT, *DRIVE, *FILEFIND, *FORMAT, *KILLADU, *LOCK, *MENU, *PURGE, *PWRBRK, *UNLOCK, *VERIFY, *VFORMAT.

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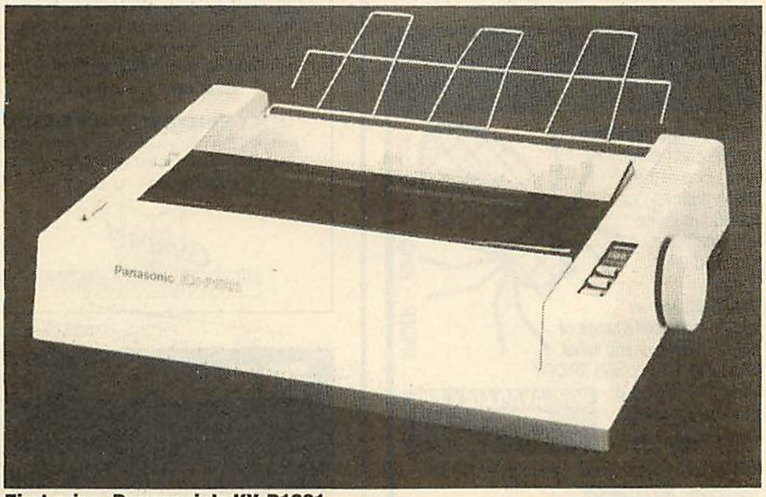
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COMPETITION

WIN A PANASONIC PRINTER

Use your skills with words in these two simple quizes and win a printer!

Tony Quinn



First prize, Panasonic's KX-P1081

acornuseracornuseracronuser	acorn
acornuseracornuseracornuser	-----
acornuseracornuseracornuser	-----
acornuseracornuseracornuser	-----
acornuseracornuseracornuser	-----
acornuseracornuseracornuser	shine

It's a wordy competition this month with a Panasonic printer on offer as the first prize. The puzzles are designed so they can be tackled whether you've got a computer or not. However, anyone with some programming skill should be able to knock up routines to give them a hand, and a wordprocessor and spelling checker could come in handy when you're struggling!

There are two parts to the competition. The first is to see how many words of four letters and more you can make from *Acorn User* – we've given you a start in the diagram above!

No repetition is allowed, nor any proper names (ie, anything with capitals in it). To settle any arguments, we'll use a *Chambers 20th Century Concise Dictionary* as found in our office. And, as usual, the editor's decision on the winner is final.

The second part is to turn the word 'acorn' into 'shine' in five steps, changing one letter at a time. All the words made in the process must make sense.

As a reward for the best demonstration of vocabulary power, we've got one of the latest Panasonic printers as first prize. The KX-P1081 packs plenty of printer power into a neat package while offering an attractive typeface for letters and a quoted 120 characters a second for fast draft printing. It plugs straight into any of the BBC range, boasts simple control and even offers an easy way around the age-old problem of how to get a '£' sign.

Bruce Smith was impressed when he reviewed it for *Acorn User*. Turn to page 145 to read his comments in full.

And for the three runners-up we've got an *Acorn User* disc binder, capable of holding a year's-worth of our monthly listings discs.

To enter, send us your list of words printed out in alphabetical order. On the back of the envelope, state how many words you've found and give your solution to the 'acorn' to 'shine' puzzle. Remember to include your own name and address — you'd be surprised how many entries we get without them!

Completed entries should be sent to: February Competition, *Acorn User*, Redwood Publishing, 20-26 Brunswick Place London N1 6DJ. Judging will take place on Friday February 12, 1988.

ACORN USER
COMPETITION
FEBRUARY

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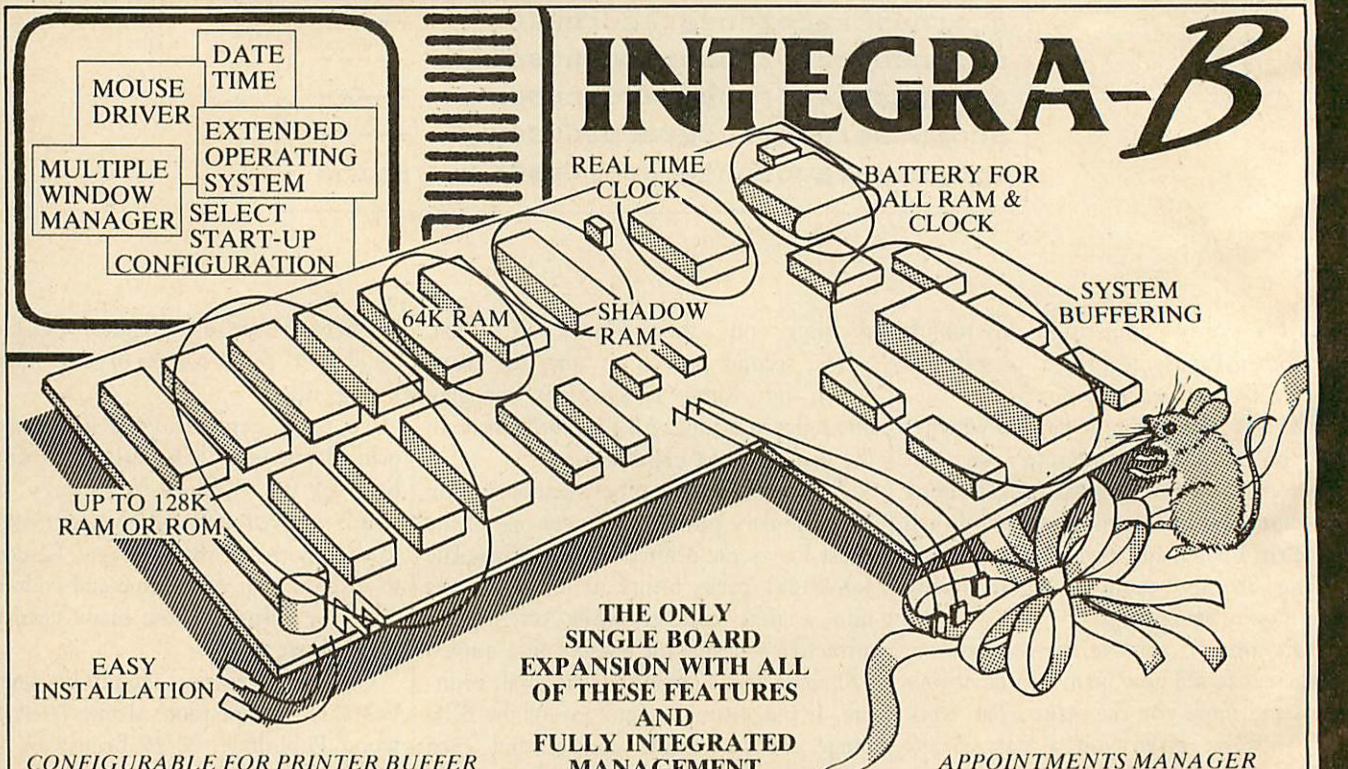
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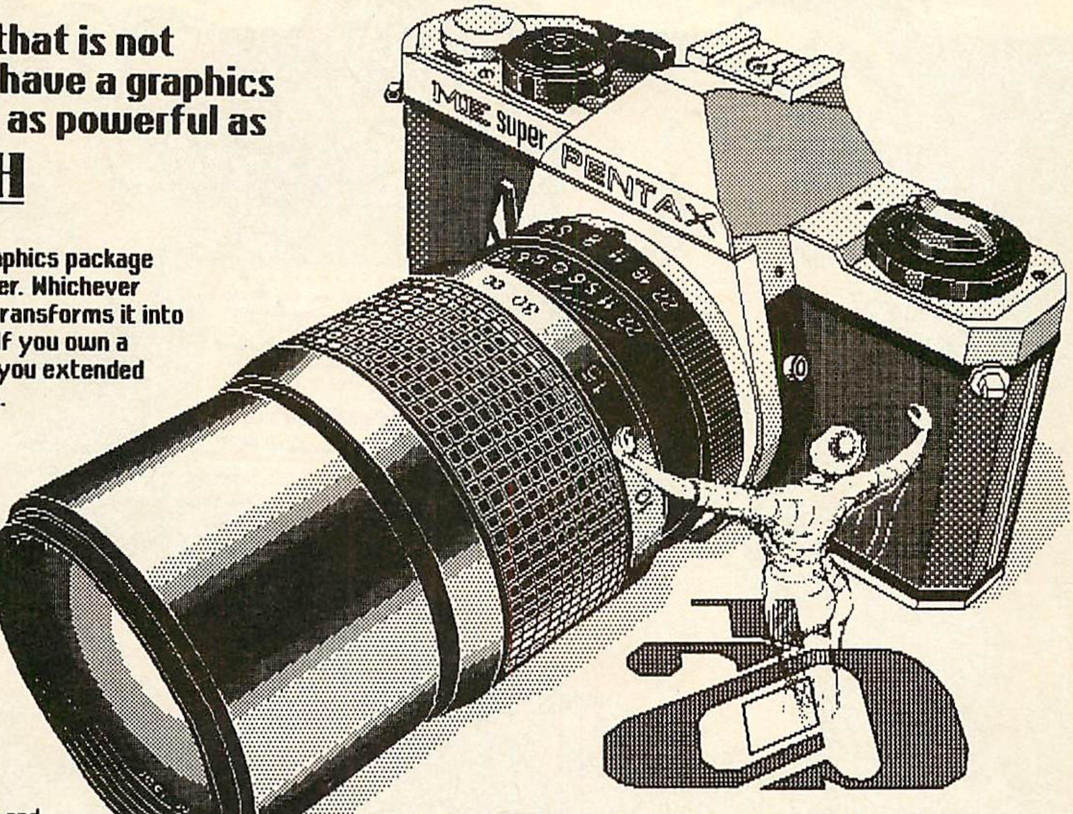
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Mode 0 - 1216 * 416
Mode 1 - 608 * 416

This whole A4 page was composed as one mode 0 high resolution image using the out-board scroll system, and has a resolution of 1216 * 900 pixels.

Microbrush for the BBC B is comprised of two 16K roms. The Master version contains a third rom. The first two roms can be used in either machine.

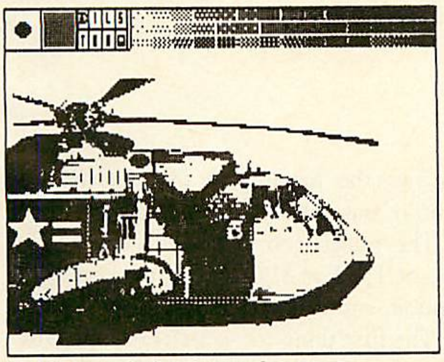
The whole system is menu driven and controlled by the Marconi RB2 tracker ball for speed and precision, but may also be used with either the AMX or the Whigmore mouse. Please note that the tracker ball is not included.

Microbrush A - £150 2, 16K roms + disc utilities, BBC B and Master
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The Colour System

This is just 1 of 33 major graphic systems contained within Microbrush and offers you 42 colours in mode 1 and 42 grey tones in mode 0. New colour palettes can be created with which you can draw lines, sketch, fill, paint in foreground, background, opaque, transparent and combined colour. Add this to a colour rubber which will selectively erase any actual colour and you have a very powerful painting system with more than **1,000,000** possible colours.



Above the painting system in mode 0.

The Ikon Generator

The ikon generator is the main workhorse of the Microbrush system as it is used for both generating and positioning any ikon up to 6 * 3 character blocks. This system is also used by the typesetter and for creating colour palettes, rubbers, paint-brushes and type-faces. Up to 46 ikons can be stored in memory. The scope of the ikon facility is immense as it allows you to transform the Microbrush system into a purpose built design tool that suits your needs.

The Type Setter

With the Microbrush system you will receive 50 proportionally spaced typefaces. The smallest allows you up to 170 characters to the line and if this is not enough then you can design your own typefaces.

The typesetter displays the current font as a scrollable menu allowing you to quickly produce professional typography.

The Screen Editor and the Special Effects Generator

The screen editor is a powerful drag system that allows you to store up to a quarter of the screen in memory. Once stored, images can literally be dragged across the screen, repeated, copied, saved to disc or fed to the special effects generator.

The Special Effects Generator

This is a very versatile system which will automatically outline, inline, shadow, 3D, half-tone, etc. any image held within the screen editor's memory.

The Injector rom

The Injector rom is the second rom in the Microbrush system. This rom contains the drawing functions such as lines, rectangles, circles, ellipses, arcs, rotate, squash, stretch, zoom, halve and quarter screens, plus a whole host of other functions.

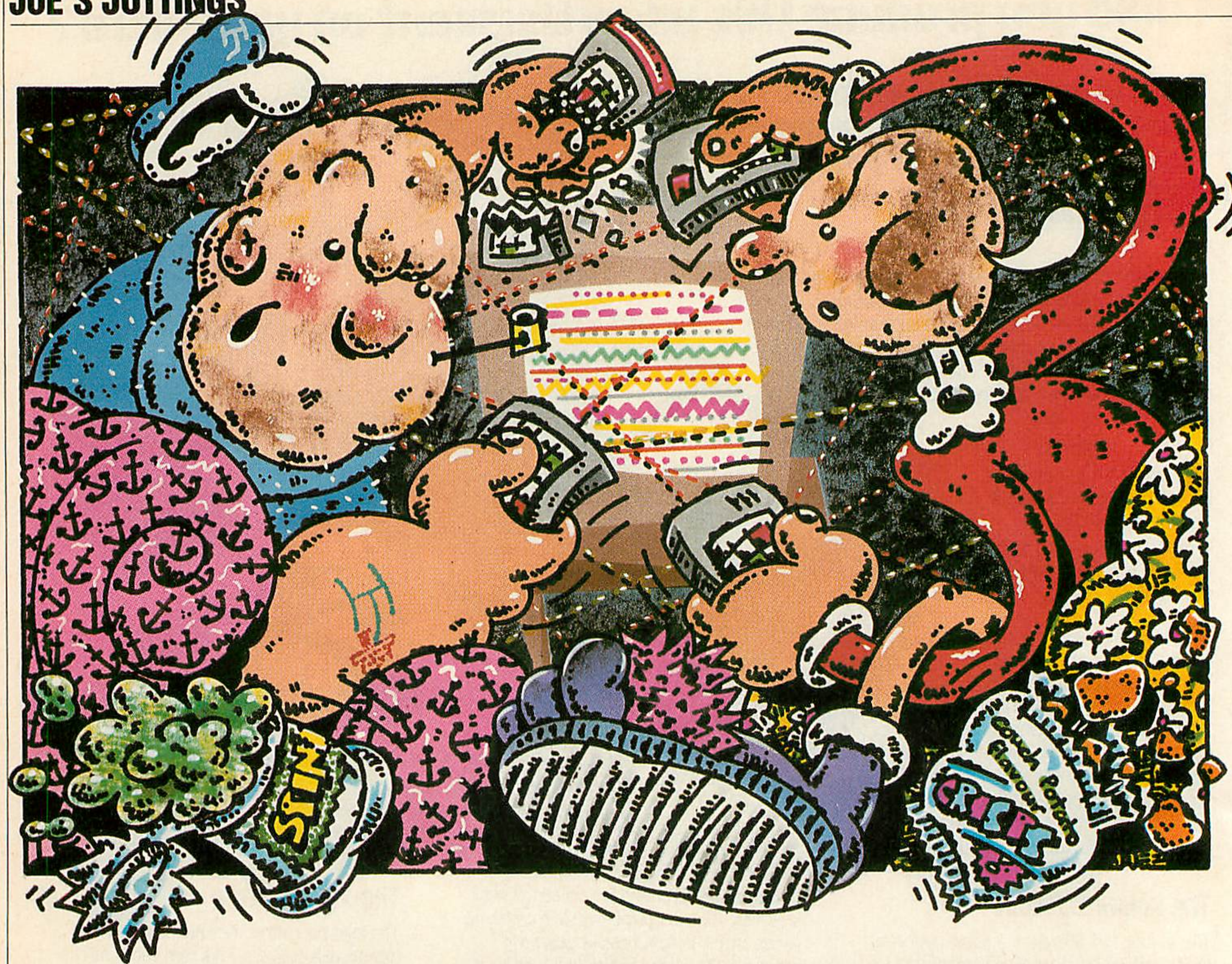
This is a very brief description of just 7 of the 33 graphics systems contained within Microbrush. All of the systems are both fast and easy to access. Microbrush also includes a 7 * 7 character pixel editor and an Epson FX80 screen dump.

The Master rom

The Master rom takes you into a completely different world of graphics with almost 4 times the resolution in modes 1 and 0, plus 2 on-board graphics screens, 10 rom based typefaces and a 10 point perspective system. This is linked to a 3D generator which is soon to be released on a 4th rom for complex perspective tasks such as the camera seen above. Also available for the Master rom is an out-board scroll system which allows you to build images with a resolution greater than 1216 * 2000, plus there are high res. screen dumps for both Epson and Integrex printers.

Lastly flick through the pages of this magazine and see how many of the other graphic systems are capable of producing their own advertising.

Extentions to the Microbrush system include - The out-board scroll system - £40, an extended Master rom offering you 14 colours in mode 1 and 4 colours in mode 0 - £85, a typeface editor plus fifteen extra typefaces - £25, the Master rom when purchased separately - £65.



TV'S BIG FIGHT

Family feuds stem from important problems – like who watches what TV programme. Use Joe's timetable program to ease the pain.

Joe Telford

Regular readers will remember the hassle caused last month by my appropriating the remote control handset from the Telford Towers television and using it to communicate with a BBC micro. As in most families, competition for programme choice is intense, and the result was a series of paths worn in the carpet by certain members trapesing up and down from armchair to TV to change channel! For the sake of the carpet and family peace I returned the remote control to the hands of my daughter, but the switching continued and disputes over the device followed.

Now most families have such problems and usually adopt one of four solutions.

First, they might buy a second/third TV – a reasonably good approach. For a mere £50 you can watch your favourites in black and white on a shaky indoor aerial, in a cold outhouse, while daughter dear uses the colour set in the lounge.

A second option is to buy a video recorder – no good for the Acorn user saving up to buy a new Nimbus.

Third, play 'pass the handset'. Everyone takes turns clicking on a channel, then throws the handset to the next person. You're out if you click on an advert!

The fourth choice is to timetable your use of TV. For BBC owners this is the best option, and if it appeals, then read on . . .

The first thing to realise is that the BBC micro won't timetable your viewing for you, just like a Prime mainframe won't timetable a comprehensive school. The role of the micro is to speed up the timetable production by highlighting problems which can be resolved by people.

Figure 1 shows two simple individual timetables with three options. One belongs

ILLUSTRATION BY PHIL DOBSON

to Sue. She can choose to place BBC1 or BBC2 in any timetable slot or she can leave any slot free. The second is Bob's. He can choose to do one of the same three things in any of his slots. In fact, both Sue and Bob have completed their individual TV timetables, which are from nine to 11 am on a particular day. Notice how the TV timetable is broken down into four quarter-hour slots for each hour. This is because the most manageable chunk of time is a quarter of an hour. If we went to shorter slots, say five or ten minutes, filling in timetables would be so laborious that people wouldn't do it.

Once the individual timetables are done, we look for clashes. This is easy with two short timetables and three choices per table. The ways in which timetables can interact in any one slot are shown in figure 2. If we do a clash analysis on Bob and Sue, we see there are four clashes, as in figure 3. Some simple maths indicates that if the timetables were designed randomly the chance of a clash in any one slot would be two in nine, or about 22 per cent. This is quite a high figure, and yet if we look at a realistic TV timetable with four channels available to two people the projected figure rises to a 48 per cent chance of a clash per slot. Figure 4 explains how this is calculated. Just multiply the options open to each person (five each) together, then divide this number into the number of 'C's in the diagram. Things become more complex the more people there are, but the programs given here will happily cope with up to five (for example two adults and three children), and still produce a clear clash table in around a minute.

What the computer can't do is choose between the options in a clash situation. Although I've seen attempts at this, for example in school timetabling, the computer is best left out of decision making.

Identifying clashes can minimise many problems. The task of designing a composite timetable is too great for many children, and the more forceful personalities get their own way. Often the balance of programs is not satisfactory, because some children will quote non-clashing slots as just cause for having their own way.

As you're probably all aware, maintaining reasoned argument is difficult when emotions are involved, and TV is very emotional for children. Therefore we should reduce the level of argument.

Finally, in a discussion between several children the thread of the argument is often lost. By producing a clash table the discussion can be focused more exactly.

OK. So we decide to use our micro to produce TV timetables. What do we do? Well, first we have to generate individual timetables for everyone who wants to watch TV on a particular day.

Next we try for a composite timetable, with a program that points out clashes. If we are unlucky, clashes will appear. We can use a further program to show who is clashing. From this we go back to re-edit the individual timetables, and through discussion, arrive at a balance of slots. A re-run of the composite timetabler and we have a TV timetable for that day.

We need three main programs, and a menu program to handle them. The reason for three programs is so that the whole system will work on almost all of the BBC micro range, though anyone without discs will have no chance, because up to five files are open at any one time. The programs in yellow pages are referred to internally as in figure 5. When you enter each program save it by its internal name, and then create a !BOOT file:

```
*BUILD !BOOT
0001 CH."!MENU"
0002
ESCAPE
*OPT 4,3
```

The system will then start when you use the Shift-Break key combination. It's probably best to devote a blank disc to this

Sue's Timetable

	.00	.15	.30	.45
9am	BBC1	BBC1		
10am		BBC2		BBC2
11am	BBC1	BBC2	BBC1	

Bob's Timetable

	.00	.15	.30	.45
9am		BBC1		
10am	BBC2	BBC1		BBC1
11am		BBC1	BBC2	

Figure 1. Individual timetables

```
1. No entry & No entry = No entry     (no clash)
2. No entry & BBC1     = BBC1         (no clash)
3. No entry & BCC2     = BBC2         (no clash)
4. BBC1     & No entry = BBC1         (no clash)
5. BBC2     & No entry = BBC2         (no clash)
6. BBC1     & BBC1     = BBC1         (agreement)
7. BBC2     & BBC2     = BBC2         (agreement)
8. BBC1     & BBC2     = ?            (clash)
9. BBC2     & BBC1     = ?            (clash)
```

Figure 2. With one slot and two channels, these are the possible interactions

	.00	.15	.30	.45
9am				
10am		CLASH		CLASH
11am		CLASH	CLASH	

Figure 3. A simple clash analysis shows that Bob and Sue have four slots to discuss

Person A> Person Bv	No entry	BBC1	BBC2	ITV(3)	CHN4
No entry	ok	ok	ok	ok	ok
BBC1	ok	ok	C	C	C
BBC2	ok	C	ok	C	C
ITV(3)	ok	C	C	ok	C
CHN4	ok	C	C	C	ok

Figure 4. Even clearing a simple timetable requires servious number crunching

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AVP

package, because it creates a file for each individual timetable, and each timetable is for one day of viewing. This means that a DFS disc will give eight days viewing for a family of three: 3 people * 8 days + 5 *system files = 29 files*. For five viewers it would allow five days.

Note that the 'disc full' and 'cat full' errors are not trapped. This is left to readers as an extension exercise. Look for DEFPROCerr in each program and add a couple of lines:

```
IF ERR=198 P."DISC FULL":ENDPROC
IF ERR=190 P."CAT  FULL":ENDPROC
```

Try to make your error messages blend in with the style of the programs.

If any program won't run as it stands, try changing mode 1 to mode 4 early in each program to gain extra memory.

On Shift-Break, !MENU (listing 1) is CHAINed in. Once the program is activated the front page shows the title and a bar menu with three choices. Use the cursor arrow keys to move up or down to the option you want and then hit Return. This has the effect of CHAINing that program. An obscure bug in my Master's operating system prevents the program from functioning without the 'Press Return to begin' message. This is annoying, but using Shift-Break without the 'INPUT " " dummy$' statement results in a 'channel' error message on my system. If you can, try ditching that line and the preceding one. The program runs better then!

The !EDITOR program, listing 2 on the yellow pages is the largest and may need mode 4 in some machines. It displays a similar menu to the first program, so that house style is maintained, but there are eight options.

The first option is to name the viewer whose timetable you are going to create. Press Return on the top line of the menu, and you are invited to enter a two-letter code, designed for initials, for the person whose timetable you are editing. Once this is done and Return is pressed, the menu returns to normal, but with the new person code in all the appropriate positions. Now decide on the date of the timetable, move the cursor down to the date entry line and press Return. You'll be prompted for a four-digit date. Enter this in the order DDMM (day then month), remembering to include leading zeros, eg, 0104 for the first of April. The date isn't checked, so silly numbers can be entered. Again, after entry the whole menu is updated. Notice that the filing section (for loading and saving timetables) uses the person code plus the date as a filename.

Program function		Yellow pages		On disc
The master menu program	–	Listing 1	–	!MENU
Individual timetable editor	–	Listing 2	–	!EDITOR
Composite timetable producer	–	Listing 3	–	!TABLE
Clash table producer	–	Listing 4	–	!CLASH

Figure 5. Save each program under the name name as it appears internally

TV Timetable for Date: 31:10

Hr	.00	.15	.30	.45
06				
07				
08		1:Roobarb	1:Chucklevision	1:Chucklevision
09	1:The Muppet Babie	1:The Muppet Babie	3:No 73	3:No 73
10	3:No 73	3:No 73	3:No 73	3:No 73
11	1:Going Live	1:Going Live	1:Going Live	1:Going Live
12	1:Going Live	1:Grandstand	1:Grandstand	1:Grandstand
13	1:Grandstand	1:Grandstand	1:Grandstand	1:Grandstand
14	1:Grandstand	*****clash*****	*****clash*****	1:Grandstand
15	1:Grandstand	1:Grandstand	1:Grandstand	1:Grandstand
16	1:Grandstand	1:Grandstand	1:Grandstand	1:Grandstand
17	*****clash*****	1:Cartoon time	*****clash*****	3:3.2.1
18	3:3.2.1	*****clash*****	1:My Family and ot	
19		3:Blind Date	3:Blind Date	3:Blind date
20	*****clash*****	*****clash*****	*****clash*****	*****clash*****
21	*****clash*****	*****clash*****	*****clash*****	*****clash*****
22	1:Paul Daniels	3:News	3:News	3:Crazy Like a Fox
23	3:Crazy Like a Fox	3:Paternity	3:Paternity	3:Paternity
00	3:Paternity	3:Paternity	3:Paternity	3:Paternity
01	4:Verdict (film)	4:Verdict (film)	4:Verdict (film)	4:Verdict (film)
02	4:Verdict (film)	4:Verdict (film)	4:Verdict (film)	
03				
04				
05				

Figure 6. A typical print out – just click back to the menu to re-organise

When you want to see what's on a disc, select the catalogue disc option. The screen will show all the available files, and prompt you to press Return to go back to the menu. To load a file, simply set the person code and the date so that the filename appears opposite the 'load' and 'save' menu items, and highlight the 'load' line with the menu bar. Press Return and the selected file will load. The loading is indicated by a shrinking line of stars, as the file loads. If the filename is incorrect, a 'Can't find . . . ' message appears. Saving works in the same way. Select the filename to save as before, and then select the 'save' line. If you haven't done any editing then you'll be told, but you can save a file that you've just loaded, either under a different name or under the same name. If you choose to use the same name, then the program checks before it overwrites the original.

There is one useful option called 'clear memory' which allows you to clear the current timetable. Simply select this and the current timetable is erased from memory, though not from disc. Note too that the memory status is indicated with an 'in use' or 'clear' message. Memory is set to 'in use' after a successful load or after an editing session.

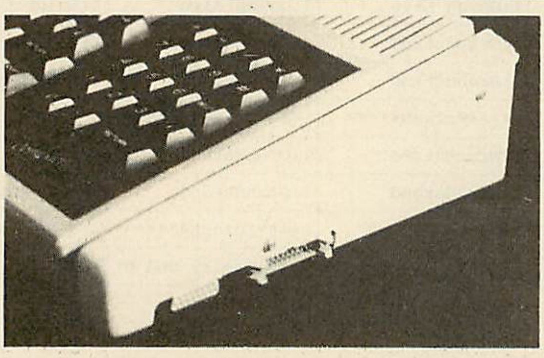
If you select 'edit timetable' the screen changes and a blank timetable for a whole day appears. This is split into two – a timetable blank at the top (most of the page) and a buffer area for text. The buffer is initially empty, and the keys indicated on the bottom screen line are all active, along with the cursor keys.

You will notice that the timetable runs to TV-time, ie, from 6am to 6am the

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following morning, and is split into day and night viewing, in hours vertically, and quarter hours horizontally. The cursor is indicated by a large white rectangle which moves when the cursor keys are pressed. The cursor right key moves through the timetable in 15-minute slots, re-appearing at the beginning when it reaches the edge of the screen. The cursor-left key moves backwards slot by slot, again wrapping at the end. The cursor down key moves in hour jumps from 6am through the day, while the cursor up key moves in hour jumps backwards. Both keys wrap at the end of the day. The Shift key used with cursor left and right switches between day and night sections of the timetable.

There are other keys which can be used once the block cursor is in place on a selected slot. The Copy or Tab keys copy the contents of the buffer into that slot, and display the channel number to indicate that the slot has been amended. The Shift key with the Copy or Tab keys copies the contents of a slot into the buffer. The Delete key deletes the contents of a slot, *not the buffer*. Escape takes you back to the menu page, leaving the timetable ready to be saved.

The Return key acts as 'enter,' and its function is to let us manually enter data into the buffer. This data includes channel, program name, as well as start and stop times. The only essential item is the channel number, though it is no great problem to enter the other items.

The majority of editing tasks can be quickly carried out with these keys. For example, to enter a one-and-a-half hour film into the program:

- Press Return and enter the details
- Move the cursor to the start of the block
- Use cursor right plus Tab or Copy to enter the details in each slot.

To move a slot:

- Use cursor keys to move to the slot
- Shift-Copy it
- Delete it
- Move to the new slot and Copy it

To delete the buffer move to an empty slot and Shift-Copy

Remember that the buffer and block cursor positions are retained between files, so cross file editing is (just) possible. To leave the editor simply select 'Return to main menu'.

The composite timetable program

From the main menu program select 'Produce daily timetable' and !TABLE (listing 3) will load and run. Its front page is similar to the others and the date, catalogue and return options have already been discussed. The other three options include 'specify viewers', and 'produce timetable'. Specify viewers prompts for a number between two and five, and then asks for the person codes for those viewers. These plus the date will give the filenames of the timetables which must be opened.

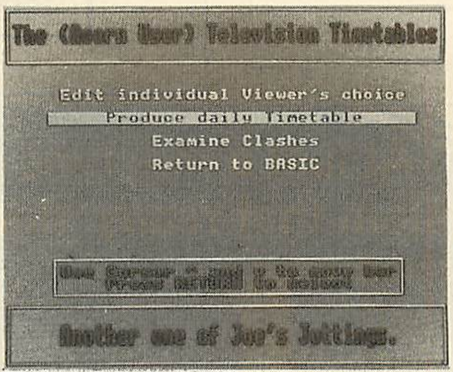
The 'produce timetables' option has two sub-options: print to screen and print to printer. A typical print out is shown in figure 6. Once this is selected the rest is automatic. After a check that the filenames exist, the timetable is printed on the selected device. Any clashes are marked simply '*****clash*****'. Once the timetable has been inspected, the menu can be recalled with the Return key.

In the unlikely case of the computer leaving files open, or locking into mode 0, the 'reset everything' option can be selected, and the program re-run from the beginning.

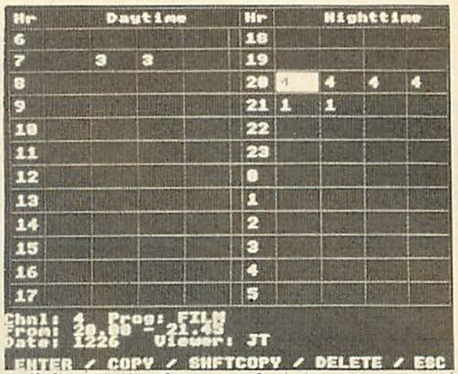
TV Clash table for Date: 31:10

Hr	.00	.15	.30	.45
06				
07				
08				
09				
10				
11				
12				
13				
14		JT1KT3	JT1KT3	
15				
16				
17	JT1KT3		RT3KT1	
18		RT3KT1		
19				
20	RT1KT3	RT1KT3	JT4RT1	JT4RT1

Figure 7. With the !CLASH program, at least you know what to argue about



Eliminate telly fights with Joe's program



Individual selections are shown on screen

The !CLASH program

!CLASH behaves exactly the same way as !TABLE except that it only prints the clashes and indicates what is clashing, so that reference back to the individual timetables can be made. The majority of the timetable is blank, as can be seen from figure 7, so discussion will be focused only on the clashes.

Advanced users with Masters or shadow RAM might like to combine !CLASH and !TABLE to simplify matters. Having used the programs for a little while, I can honestly say that holiday viewing at the Towers has much improved, but I wish I could get central heating in the outhouse. It's very cold there, with the portable black and white TV. . .In fact the only things I don't miss are the fights over what to watch and the ever widening bald patches in the living room Axminster.

Turn to the yellow page index on page 113 for details of Joe's listings.

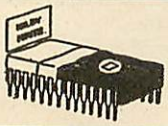
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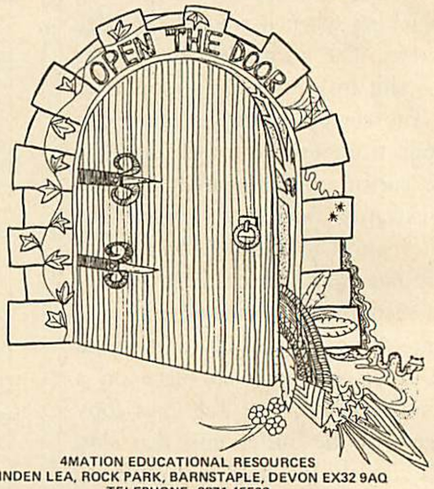
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A comparison of three 65C12 assemblers

Feature	ADE +	BBC Basic	MACROM
Number of pseudo-ops	64	4	36
Use of all available RAM	Yes	No	No
Macros	Yes	No	Yes
Relocatable output	Yes	No	No
Linker with libraries	Yes	No	No
High level constructs	Yes	Yes	No
Number of error reports	39+warnings	3+BASIC errs	20
65C00 extended opcodes	All	65C 12 only	65C 12 only
Switch of 65 C 12 opcodes	Yes	No	No
ROM size	32K	16K	16K
Disassembler	Yes	No	Yes
Label restrictions	No	Yes	Yes

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BBC TO ARC DATA LINK

Bought a new machine and your old 5.25-inch discs won't fit? Your file transfer problems are solved

David Watkins

If you've got a BBC model B, B+ or Master 128 micro and you upgrade to a Compact or an Archimedes you'll probably not find it easy to transfer programs and data files from one machine to the other.

It's really easy if you've fitted a 3.5-inch disc drive and the ADFS to your original BBC micro. The Archimedes and Compact are fitted with 3.5-inch disc drives and each comes with the Advance Disc Filing System as standard.

It is possible to fit a 5.25-inch drive to either machine, but the Archimedes needs extra buffer circuitry to do so. If you do fit an external 5.25-inch drive to an Arc, then you will still only be able to use the ADFS, as the Archimedes lacks the circuitry needed for the ordinary Disc Filing System used by most BBC micros. Master Compact owners have an advantage here, as fitting an external 5.25-inch disc drive as drive 1 is simple, cheap, and does not affect the warranty. There is also a sideways RAM version of the 1770 DFS software on the Compact's Welcome disc.

For the Compact, more software houses are now providing software on 3.5-inch disc, but it still isn't possible to get everything you want. As yet, software for the Archimedes is thin on the ground, and like any radically new micro, it will be some time before an adequate software base is available. As an interim measure, Arc owners will want to capitalise on their existing BBC micro software. Old programs can make use of the increased speed of the ARM processor, and it is vital to be able to use existing database files, wordprocessor text files and spreadsheets. Existing Basic programs that are well-written should run directly on the Archimedes' Basic 5. In addition the program called *65Arthur* emulates the 6502 processor of original BBC micros. So you will be able to use 6502 machine code programs and your old ROMs (or at least disc images of ROMs) providing they are Tube-compatible. The only problem is how to get the software transferred to the Archimedes.

There are three main types of file that you may wish to transfer:

- Legally written BBC Basic programs that will run using the Basic on your new machine with little or no change. On an Archimedes, Basic 5 means you get much faster speeds, and even the Compact's Basic 4 is slightly improved over earlier versions of the language.
- Images of ROMs such as Pascal, *View*, *ViewStore* and *ViewSheet*. They will run on the 6502 emulator, or on the Compact using sideways RAM. It is true, however, that not all ROMs will run on the newer machines – in particular 'service' ROMs that contain utility star commands or deal with hardware.
- Data files produced by these language ROMs, such as wordprocessor files or database files.

It's reasonably easy to transfer all three types of file via a cable linked between the serial ports of the two machines. You can use the same method between any BBC micros fitted with serial ports with incompatible storage media. It involves directing output on the sending machine to the serial port instead of the screen, and taking input on the receiving machine from the serial port instead of the keyboard or disc.

Figure 1 shows the connections needed to transfer programs and data between any model B or Master series micro. Figure 2 shows the connections needed between an Archimedes and another BBC micro. The diagrams show the plugs as they appear from the back as you solder them up.

The cable is fairly easy to make up – with five-core cable, a five-pin domino DIN plug for a BBC micro and a nine-pin 'D' connector for an Archimedes. Of

PHOTOGRAPH BY JOHN BARLOW. SCREEN GRAPHICS BY ROB MILLER



course, a standard Compact will also have to have the serial upgrade chips fitted. This is an easy job, and was covered by David Atherton in *Acorn User* January 1987.

Once the cable is ready, transfer of an ordinary BBC Basic program is easiest of all. It involves listing the program to the serial port instead of to the screen on the sending machine, and inputting from the serial port instead of the keyboard on the receiving machine.

Function keys can be used to allow a series of commands to be entered with a single keystroke as a quick way to configure the sending and receiving machines . If you're confident with !BOOT or exec files, then you will no doubt use a file to load these function key definitions automatically. First, make sure both machines are showing the '>' Basic prompt, and define a function key on the sending machine with:

```
*KEY 0 "*FX 7,7|M*FX
8,7|M*FX 3,7|MLIST|MPRIN
T"*FX 2,0"|M*FX 3,0|M"
```

Then program a function key on the receiving machine like this:

```
*KEY 1 "*FX 7,7|M*FX
8,7|MNEW|M*FX 2,1|M"
```

Now load the Basic program into the sending machine, press f1 on the receiving machine and f0 on the sending machine. The program is transferred into the receiving machine's memory. You can then list it and save it on the receiving machine's disc in the normal way.

The situation is not quite so easy for ROM images or data files, as they are not listable, and they have important extra information like load and execution addresses attached to the files that need transferring too. Listing 1 on the yellow pages will allow you to transfer a file from the disc on one machine to the disc on the other. So it solves all the problems of incompatible disc types between the B, B+, Master 128, Compact and the Archimedes micros.

Type the program into one of your machines, save it, and transfer it with the function key method to the other. Don't forget to save it on the other machine too, or you will have to transfer it again later.

The program assumes the default data configuration of the Archimedes and Master. This is stored in the CMOS RAM and some machines are set up differently. To check your micro, type *STATUS DATA and press the Return key. This displays the existing data configuration of the machine. If it doesn't show a value of four, then you will need to change it: just type *CONFIGURE DATA 4 and press Return. Then press CTRL-Break. On a model B or B+, the serial data format isn't stored in CMOS RAM, so if you juist press CTRL-Break it will be set to the proper default value.

To transfer any sort of file, connect both machines together with a suitable cable, then run the program in both machines. Now decide which keyboard you wish to work from – either will do – and type 'S' if it is to be the sender, or 'R' if it is the receiver machine. The keyboard that you choose to use will be active, while the other remains passive and needn't be touched. The program prompts you to type in the name of the source file to be transferred, and also the destination name. If you want to keep the same name, then just press Return in reply to the 'Destination filename' prompt. The file will then be transferred from the disc drive on your sending machine, and saved on the disc drive on your receiving machine.

The original version of listing 1 was written before any Archimedes micros were delivered to customers, and it was tested between a model B and a Master 128 micro. The file information was read into a data block, which was then transferred, and the file itself was sent across the serial link one byte at a time. This was slow and steady, but it worked perfectly.

The first Archimedes were delivered in August. Early machines came with a pre-release operating system, Arthur 0.2, and with serial port hardware that did not work properly. The handshake protocol, involving the RTS and CTS (ready to send and clear to send) lines is used to control the flow of data between the two machines was faulty. On Arcs, faults in the hardware and software corrupted incoming data. This meant, of course, that the original program would not work, and will cause problems for forthcoming Arc software such as terminal emulator packages. The hardware faults are overcome by wiring serial cables in a different way to the design originally envisaged by Acorn, and figure 2 incorporates this change. But the software problems are solved only by using later versions of Arthur. The original transfer program was rewritten so it avoided using the faulty handshaking protocols. It transfers files in small blocks and, as it uses fewer disc accesses than the previous version, it has the bonus of being faster. It should work on all pre-release and release versions of Arthur. Originally, informative progress messages were printed on both screens as files were transferred, indicating the state of transfer. But as these invoked the handshaking protocol and caused unpredictable data corruption, they have been

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eliminated. Archimedes owners with properly working serial interface software, using Arthur 1.0 or later, may be able to replace these progress messages.

The program in listing 1 runs in mode 4. It uses dark blue on a cyan background for clarity. Many people dislike the Archimedes' version of mode 7, and changing the background colour in mode 6 gives black lines so mode 4 gives the best compromise between display and program memory. PROCtitle sets the screen colours and prints an underlined title.

PROCinitialise sets up two blocks of memory. One is for the file at block that holds the loads and execution address, plus the filename. The Osfile routine is used to dig out this information. The Osfile parameter block only needs to be 18 bytes long, and the remaining 110 bytes of the memory block are used to hold the filename – this will accommodate ADFS pathnames up to at least eight directories deep if need be. The first two bytes of the Osfile block are loaded with the location of the filename (using !block%=block%+20). The memory block is a buffer 8k long for data. There is also a string array to hold the names of the possible machine types. All buffers are cleared with *FX 15,0. The data transfer rates are set to 19200 baud for both transmit and receive with *FX 7,8 and *FX 8,8, and the input stream is organised with *FX 2,2. There are a number of reasons why you may wish to reduce the data transfer rate, even though this will slow the program down a bit. If you have 0.2 Arthur, and wish to transfer files from an Archimedes to another BBC micro, then you'll probably need to change the values in PROCinitialise to *FX 7,4 and *FX 8,4. The User Guide for the model B states that 19200 baud is not guaranteed. It's known that some extra ROMs affect the model B's performance at this speed too, so model B users may also need to fine-tune their systems to get the best speeds. Try *FX 7,7 and *FX 8,7. The *FX 7 and *FX 8 commands must be the same in both the sending and receiving machines, so clearly they have to be tuned for the slowest machine in your system.

The machine types are read into the type$() array, so that both the sending machine and the receiving machine can be identified. The version number of the machine's operating system by the function FNtype which uses Osbyte with A=0; the value returned in X would be, say, 2 for a normal model B+. X% is not zero before this call: anything except zero would do, but it is convenient to point X% and Y% to the Osfile block before FNtype. Lastly, the data buffer pointer, which keeps track of the current position in the data buffer, is set to zero.

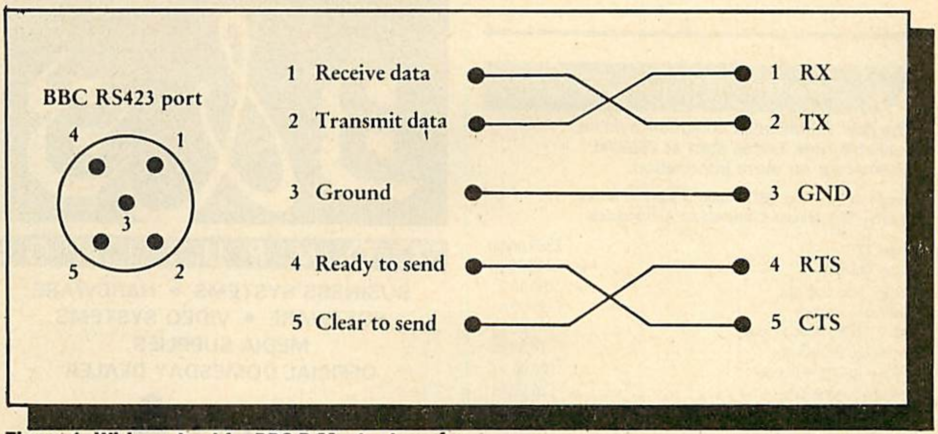


Figure 1. Wiring a lead for BBC B/Master transfer

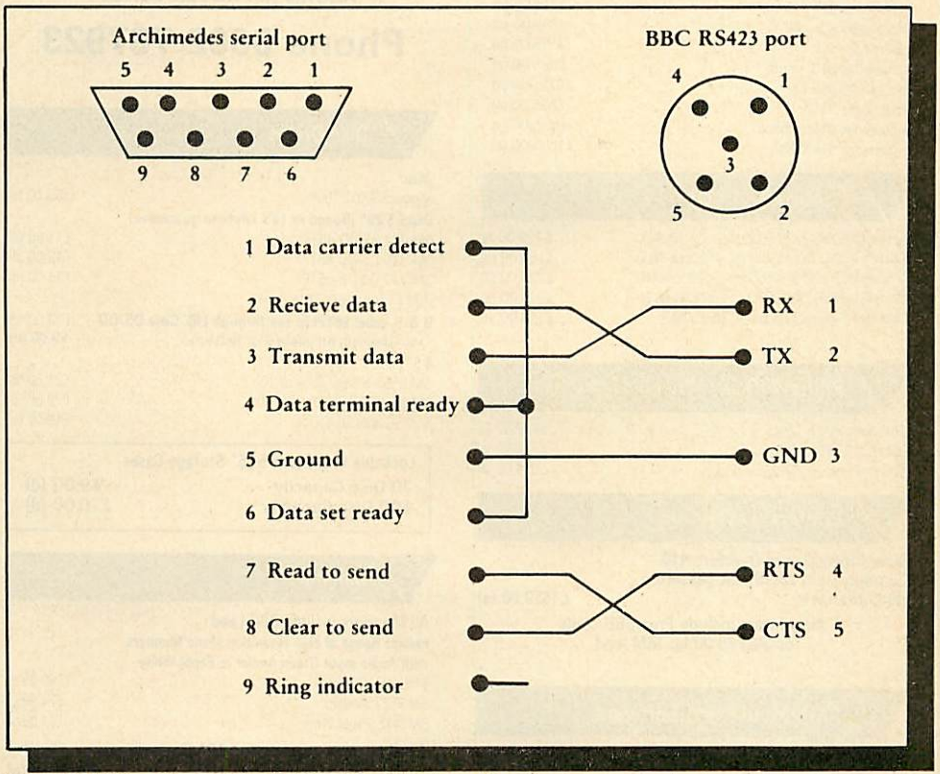


Figure 2. Wiring diagram for BBC/Archimedes transfer

PROCcontact is used to establish contact between the two machines. Remember that both machines are running the same program, so some parallel thought is needed to follow the logic from here on. On the first machine, this procedure sends its operating system number to the other machine and waits until the serial input buffer contains a byte. ADVAL (-2)<>0 is used to find when the serial system receives a byte. The second machine will flush all its buffers with *FX 15,0 before it sends its own operating system (OS) version number, so it loses the byte just sent to it. When a valid OS version number is received by the first machine, it must re-send its OS version number because the second machine has just ignored it a second time. The second machine also sends its OS version number twice, but this is later discarded by PROCchoose.

PROCcontact uses PROCsend(char%) and FNget to send a byte to, or collect a byte from, the serial port. PROCsend (char%) enables output only to the serial port and temporarily disables both the screen driver and the printer driver, with *FX 3,7. This stops the screen driver from intercepting VDU-type control codes, and prevents the printer driver from sending data to the printer after a VDU 1. The byte is written to the serial port and then the usual output options are restored. FNget is called when the serial input buffer contains a byte. It selects and enables the serial port

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instead of the keyboard device with *FX 2,1, takes the byte from there and then re-selects the keyboard as input device. It leaves the RS423 enabled with *FX 2,2.

When contact has been established, both machines wait for you to choose which keyboard you wish to use, and whether it is to send or receive the file. PROCchoose performs a loop until either the keyboard buffer or the RS423 buffer contains the ASCII code for either R or S. The buffers are monitored using ADVAL (-1) and ADVAL (-2) respectively. The role of each keyboard is then printed on both screens. You may wish to add an option here to examine the catalogue of the disc on either machine, or change directories or file attributes at this stage.

There are four possible options, with each keyboard being either active or passive, and the active keyboard either sending or receiving. PROCtransfer takes the state of the keyboard and the role of the machine and selects the necessary actions for the transfer.

If the keyboard is active, then PROCfilename is used to collect the source and destination filenames. If you want the file saved with the same name, remember that you can just press the Return key instead of repeating the filename as 'Destination filename'. The error trapping in the program is minimal, and you should take care that filenames are typed correctly or add a routine to check that the source file exists. The sending machine will exit via PROCerror if the file is not found. If this happens you will need to press the Escape key on the receiving machine and start the process all over again.

The active sending machine transfers the file with PROCsendfile. This procedure places the source filename for the Osfile block with $(block%+20)=sfn$, and performs the Osfile call with A=5 to find out the file's parameters – load address, execution address and length. The block is then modified to contain the destination filename, if that is different, and the whole 128 byte block is transmitted with PROCsend(char%). The passive receiving machine receives the 128-byte block, so it knows the expected length of the file it is about to receive.

PROCsendfile opens the file and reads it into the 8k buffer one byte at a time. If the file is less than 8k, then it is transmitted by PROCsendend which uses the pointer as an end marker. If the file is larger than 8k, then part is read in and loading pauses while the buffer is transmitted by PROCsendbuffer. The buffer is then refilled, and the next 8k block transmitted, and the process is repeated until the end of the file is reached.

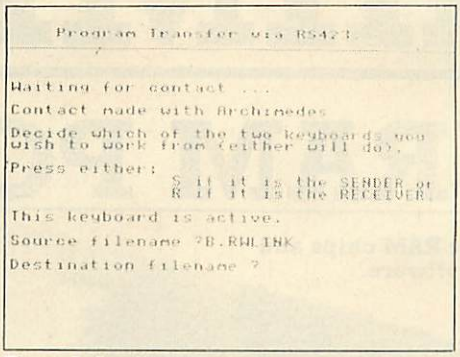


Figure 3. Sending programs to an Arc

A passive receiving machine uses PROCgetfile to collect the file in the same format that PROCsendfile transmits it. First, it uses FNget to collect the 128-byte parameter and filename block, from which it reads the filename and file length using $(block%+20), and !(block5+10). It opens or creates the file and then transfers data from the serial port to the buffer. When the buffer fills up, it is saved to disc, and this also happens at the end of the file – when the total expected number of bytes have been received. Once the file is all saved, it is closed. Now the parameter block is adjusted slightly, and an Osfile call with A=1 is used to save the load and execution addresses.

As a by-product, this also saves the file's attributes. It is worth pointing out that the meaning of these is filing system dependent – a file transferred from DFS on a model B to ADFS as an Archimedes or Compact ends up with only its L attribute set. This means that it must be changed, with the *ACCESS command, before it can be used normally on the ADFS machine. The command *ACCESS <filename> WR will allow the file to be used for both reading and writing.

The extended attributes used by the Archimedes' ADFS, such as the file type and date stamp, will also be wrong. For example, you will not be able to run a Basic program with a star command until you have loaded and re-saved it on the Arc. For files longer than 8k, PROCsendbuffer has to wait until the receiving machine has saved the buffer before loading and sending the next buffer full, in order to avoid handshaking problem in early Arthur releases. It waits until the receiving machine sends back the value 42. If your Archimedes is fitted with Arthur 1.0 or later, or if you're using the program exclusively on ordinary BBC micros and the Master series, than you may wish to leave this out of PROCsendbuffer and PROCgetbuffer. You can double the transfer rate by deleting lines 1390 to 1430, and line 1790. But if you find your files are corrupted, then you will have to replace the deleted lines and transfer the files again.

In the other case where the sending machine is passive, the active receiving machine sends both the source and destination filenames to the passive sender using PROCsendname. This simply 'prints' the names to the serial port. PROCgetname on the passive sender collects these filenames from the serial port with INPUT statements. The passive sender then uses PROCsendfile and the active receiver uses PROCgetfile to perform the transfer, which progresses in the same fashion as described earlier.

There are many improvements which could be made to this program, in addition to those already suggested. Writing and reading the file to and from the disc could be speeded up by using Osfile instead of BGET# and BPUT#, or the active machine could be made to display either or both disc catalogues. The program could be modified for mutliple file transfer. If the receiving machine is an Archimedes, then the program could detect most common file types and modify the attributes properly. If you do add any of these improvements, then let us at *Acorn User* know.

Details of the file transfer listing can be found on page 113.

SOFTWARE COMPATIBILITY

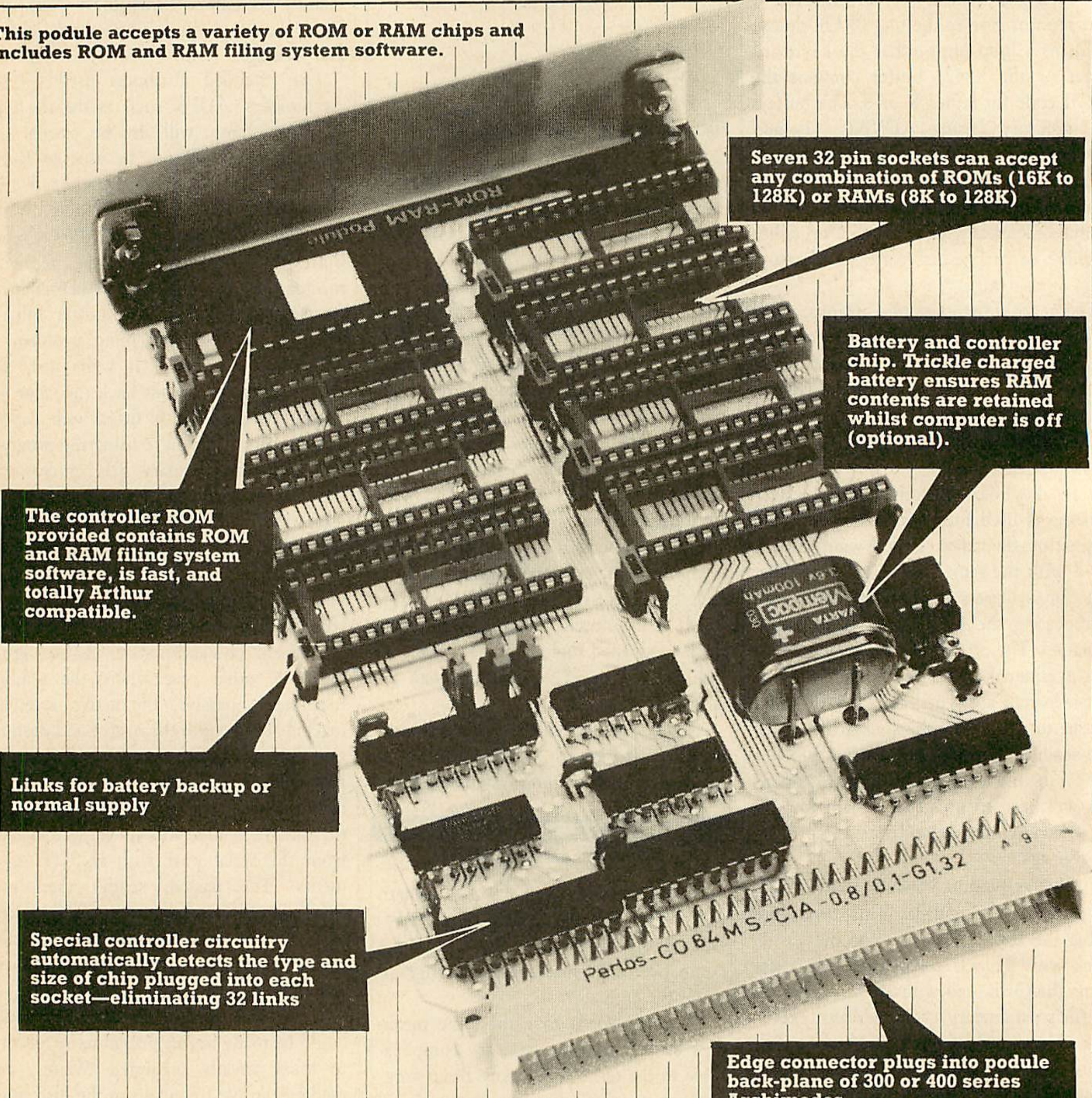
The guidelines on Arc software compatibility seem straightforward: legal BBC Basic programs will run, as will Tube-compatible 6502 machine-code programs using the emulator.

Most keywords have the same meanings as before. But there are complications to the term 'legal'. Any Basic program can use the indirection operators ?, ! and $ to access memory directly. Any access to an absolute memory location usually won't work on the Arc – the only legal way to use indirection is within a block of memory set aside with DIM. It shouldn't be used to peek or change locations within the Basic work space or operating system. Other direct memory access creates problems too. You can't load a screen image using *LOAD PIC FFFF3000, for example.

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MAKING AN IMPRESSION

With the humble nine-pin dot-matrix printer now looking decidedly old fashioned, what are the options for a first-class printout?

David Atherton

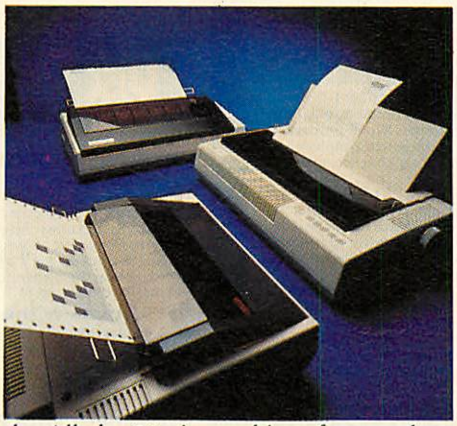
Our choice in printers used to be limited to nine-pin dot-matrix machines or daisy-wheel printers. Dot-matrix printers can print most things, including graphics, but you can always recognise the dotty print. Daisy-wheels produce print indistinguishable from the best typewriter, but are hopeless at anything other than standard size text.

Recently, however, the choice has been widened by new developments in printer technology. The latest 24-pin dot-matrix printers now offer better quality output, sufficiently good to make daisy-wheel printers redundant. Although they are about twice the cost of the older nine-pin models, that's no more experience than the nine-pins were when they first appeared seven or eight years ago.

The product of the moment, however, is the laser printer. Working in a totally different manner to other printers, these offer the best quality output of all, almost on a par with traditional typesetting. But laser printers are considerably more complex than other types of printer, and they are very difficult to program. Laser printers are also known as page printers, because they can only work in complete pages, whereas the other types can print short chunks or very long continuous items – address labels for example.

So, is it time for you to upgrade? And if so, is a 24-pin printer adequate for your needs, or will you need a laser printer?

The 24-pin dot-matrix printer works in exactly the same way as the nine-pin variety, although the finer matrix is accompanied by many other modern features. Ten years of dot-matrix technology has ironed out the physical annoyances of early mod-



els. All the 24-pin machines from makers such as Star, Epson and NEC are fast, and have reasonable paper loading, feeding and ejecting mechanisms. 24-pin models cope well with both friction and tractor-fed paper. Compatibility with the control codes of the earlier Epson printers is good – they all work to at least FX80 level. Because of the higher resolution, the printers can offer several different typefaces, and many machines offer plug-in font cartridges to extend the range.

The principal reason you'd buy a 24-pin printer is if you are currently using two printers. Many people use a nine-pin dot matrix machine for graphics and general use, but stick to a daisy-wheel or typewriter for important letters which have to look good. The 24-pin output in standard letter-quality mode, or from plug-in additional fonts, is sufficiently good to substitute for a daisy-wheel in almost all cases. The exception is where you deliberately want to give the impression of not being computerised. Some people find a recognisable 'typewriter' output somehow more 'personal' than computer output.

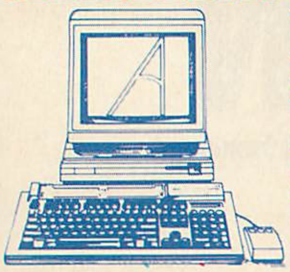
Another reason might be that you want extra quality but your specific software package won't work with any laser printers. The 24-pin printers usually use exactly the same control codes as their nine-pin equivalents, but laser printers often have FX80 emulation modes, too. But the best reason for buying a 24-pin machine is if you feel that you don't quite need a laser printer – perhaps you are doing nothing more than printing out letters. Even with a sheet feeder added, a 24-pin printer usually costs considerably less than a laser printer.

Some laser printer models are being marketed very aggressively at the moment, and the prices are now reaching a level where they are within reach of the business user of a BBC micro, and possibly the more adventurous home user as well. Obviously a laser printer represents a considerable investment, so what are you going to get in return?

The growth of laser printer sales, and the consequent reduction of prices, is due to the advent of desktop publishing – making up pages on screen, perhaps in multiple columns, with graphics inserted, and then printing out the results in high-quality form. BBC micro desktop publishing packages such as *AMX Stop Press* and Mirrorsoft's *Fleet Street Editor*, as well as word-processors such as *View*, use printer drivers – separate pieces of program which deal with output to different kinds of printer. Each type of printer demands a different type of driver. Drivers for laser printers are just starting to appear, and during 1988 it is likely that laser printer drivers will be written for every serious word processing and desktop publishing package. If you're considering buying a laser printer, it's a good idea to check with the suppliers of your favourite packages that laser drivers exist, or are being written. For word-

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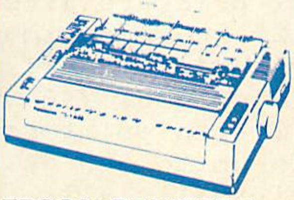
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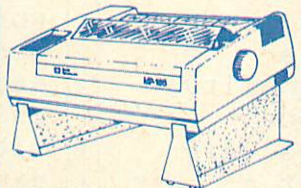
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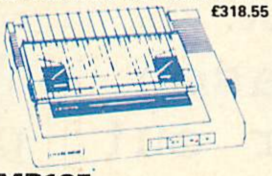
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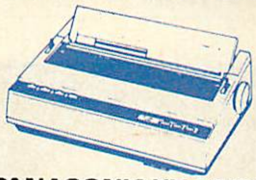
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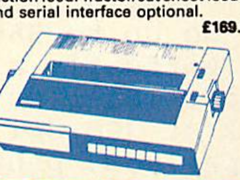
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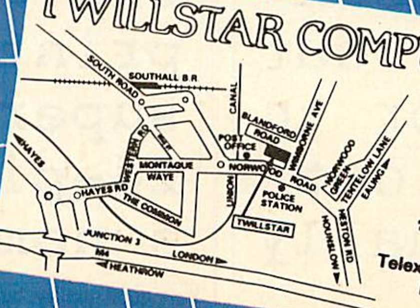


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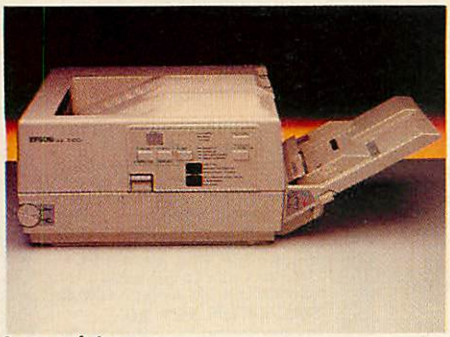
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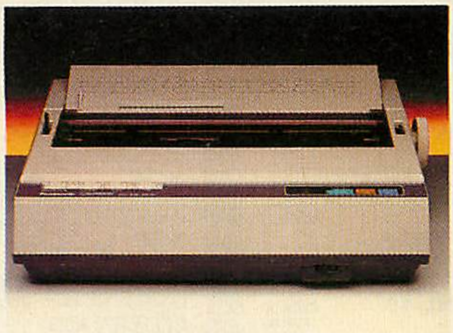


Laser printer

The big issue with printers is resolution, sometimes expressed in qualitative terms such as single, double and quad density, and sometimes in dots per inch (dpi). 9-pin matrix printers give 60, 120 and a maximum in quad density, if you have it of 240 dpi. 24-pin printers can go up to 360 dpi, and virtually all office laser printers work at 300 dpi. By comparison, photo-typesetting machines such as those used to produce Acorn User work at between 1000 and 3000 dots per inch, which can usually be regarded as perfection. Daisywheels don't work in dots, but the best possible daisywheel quality, using a carbon ribbon, looks very similar under a microscope to laser printer output.

The reason
printer out
superior tc
24-pin dot
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High resolution output



Daisy-wheel printer

The big issue with printers is resolution, sometimes expressed in qualitative terms such as single, double and quad density, and sometimes in dots per inch (dpi). 9-pin matrix printers give 60, 120 and a maximum in quad density, if you have it of 240 dpi. 24-pin printers can go up to 360 dpi, and virtually all office laser printers work at 300 dpi. By comparison, photo-typesetting machines such as those used to produce Acorn User work at between 1000 and 3000 dots per inch, which can usually be regarded as perfection. Daisywheels don't work in dots, but the best possible daisywheel quality, using a carbon ribbon, looks very similar under a microscope to laser printer output.

The reason
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Very good quality, but inflexible

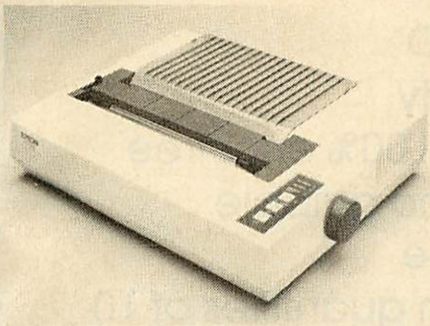


24-pin dot-matrix printer

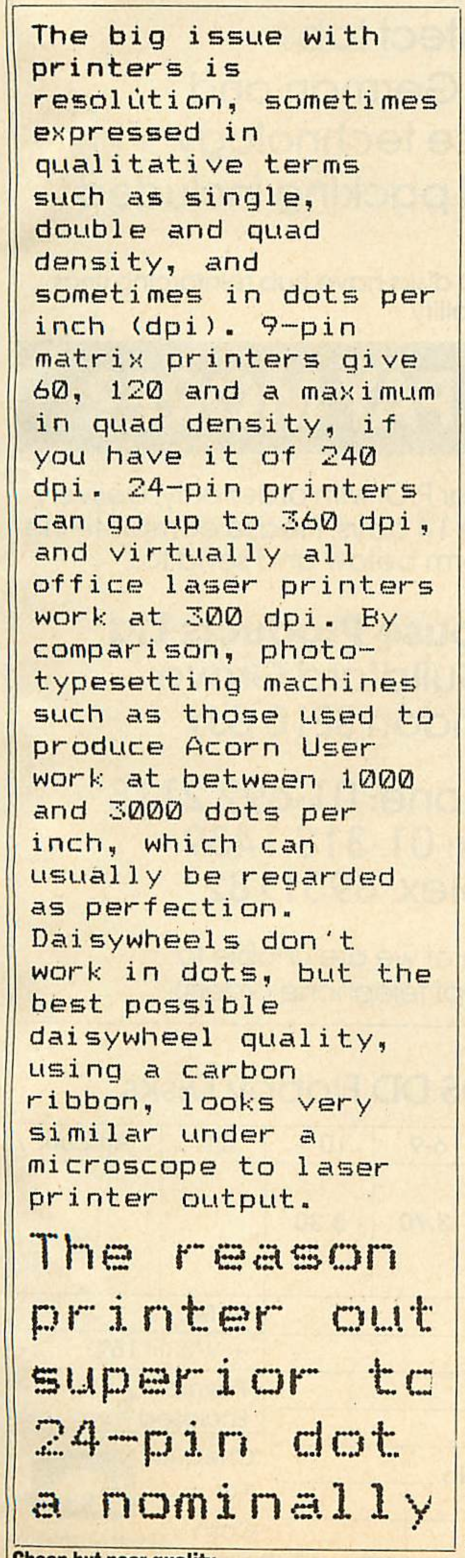
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The reason
printer out
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24-pin dot
a nominally

Good quality, and falling prices



Nine-pin dot-matrix printer



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using a carbon
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The reason
printer out
superior tc
24-pin dot
a nominally

Cheap but poor quality

processing, where the only requirements are bold text and underlining, it's very unlikely that you'd have any trouble finding a suitable driver.

Laser printers nearly always offer 'emulation modes'. This means they can accept the control codes intended for other types of printer. For example, many laser printers have a mode to partly emulate the Epson FX80, and most can emulate the Hewlett Packard Laserjet, probably the most popular laser printer. Some will also emulate daisy-wheel printers, usually the upmarket Diablo 630, but it is rare to see emulations of low-cost daisy-wheels such as those from Brother and Juki. An important point for BBC micro users is that that many laser printers do *not* emulate the graphics mode of the FX80. This is vital, as many BBC software packages assume the Epson FX80 is the 'standard' printer. It is possible to use a laser printer to do something between plain wordprocessing and desktop publishing. For example, if you are producing an academic journal, specialist newsletter or sectional report, you can use a wordprocessor to create the text in the normal way, and then insert control codes in the heading and tables to select different fonts and typesizes.

Resolution

The big issue with printers is resolution, sometimes expressed in qualitative terms such as single, double and quad density, and sometimes in dots per inch (dpi). Nine-pin matrix printers give 60, 120 or a maximum of 240 dpi in quad density, if you have it. Twenty-four-pin printers can go up to 360 dpi, and virtually all office laser printers work at 300 dpi. By comparison, photo-typesetting machines such as those used to produce *Acorn User* work at between 1000 and 3000 dots per inch, which can usually be regarded as perfection – certainly the quality of the paper becomes the limiting factor. Daisy-wheels don't work in dots, as they strike whole letters onto the page in one go. But the best possible daisy-wheel quality, using a carbon ribbon, looks very similar under a microscope to laser printer output.

The reason that laser printer output looks superior to even a 24-pin dot-matrix printer is quite simple – despite the higher resolution of the matrix printer, the dots themselves are finer on the laser printer. A matrix print head working at maximum resolution is let down by the ribbon, which will run dots into each other at anything closer than 120 dpi. The 24-pin dot-matrix printers needles are finer than nine-pin models, but the ribbons aren't much better.

Resolution is particularly important when a document has to be printed at the final size, or even enlarged. If you are reducing a document photographically or using a reducing photocopier, then the quality increases and the differences between the various types of printer are less noticeable. Also, if you intend to photocopy your final work, you'll find that differences disappear as the photocopier blurs dots and smooths sharp edges.

Page description languages

All computer printers work at several levels. For example, every type except a daisy-wheel allows you to print individual dots, and every type has a facility where if you send it a character code, it will respond with its own pattern for what the character ought to look like. So an Epson printer will show the same font on paper, whether it is connected to a BBC micro or IBM or any other type of computer. Most printers will print effects like bold after a single control code – there are still a few daisy-wheels which need you to send the character, then a backspace, then the character again to embolden, but they are few and far between. Plotters such as Linear Graphics' Plotmate and even the Tandy CGP115 or MCP40 will draw graphics from line commands, rather than requiring all the individual dots which make up the line to be specified.

Page description languages are a glorified form of this type of thing. They will accept commands for font selections, highlighting, font size and orientation, and all the usual graphics commands too. Normal screen dumps can be incorporated as well, following the relevant 'bit image graphics' code with a stream of binary data. An important point is that as laser printers build up the image in memory, rather than on paper, earlier bits of the design can be overwritten by later bits – so if you send the command for a black box, and then overshadow it with a larger white box, the final page will show no trace of the first box.

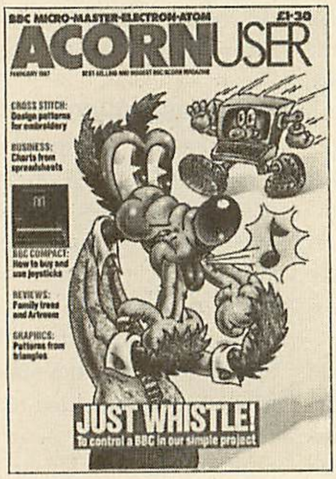
A page description language is usually in readable English, rather than the short control code sequences you might find on matrix printers.

Why are page description languages so important? The reason is that, like computer languages, they are available for more than one machine. The dominant industry language is PostScript, developed by the American firm Adobe Systems. PostScript

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is available on around a dozen models of laser printers, and at least as many 'real' typesetting machines (known as imagesetters). This means that a document can be prepared on a computer which will produce PostScript output, and then any PostScript compatible printing device will correctly produce output from it.

This is vitally important if you need to see your finished output as it will look, but can't afford an expensive imagesetter. A relatively cheap PostScript laser printer will produce a print-out which looks almost exactly like the final typeset product – in fact to the untrained eye it's almost indistinguishable.

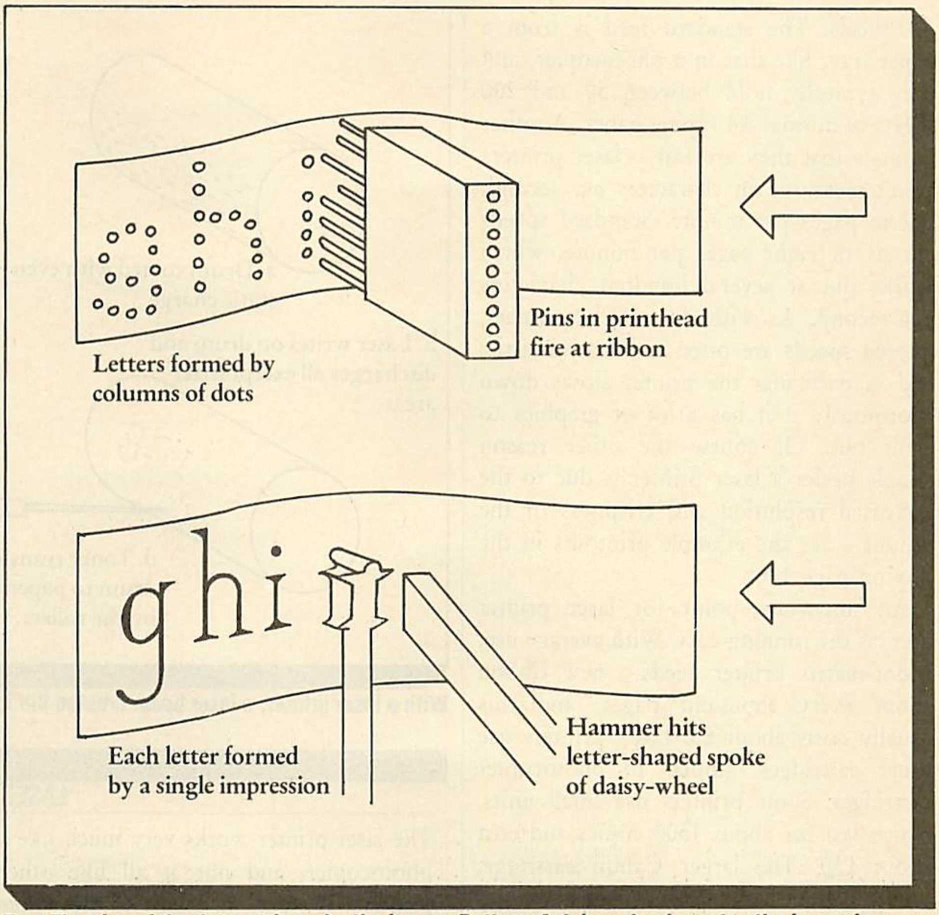
PostScript laser printers tend to cost about £2000 more than the cost of the equivalent devices without a PDL. There are three reasons. A minor factor is the more powerful computer that needs to be built into the machine required to run the PDL. A larger portion of the extra cost is accounted for by the fonts included with PostScript printers. These tend to be original digitised typefaces on which royalties must be paid to the owners of the typeface designs. The final part of the cost is the royalty paid to Adobe for the use of their PostScript language, reportedly $200,000 to start with plus $100 per machine.

There are other PDLs around. Document Description Language (DDL) is one developed for Hewlett Packard laser printers, and Imagen and Interpress are others, available on a few machines. But this year, IBM adopted PostScript for their systems, which more or less defines the standard. Furthermore, a number of companies have recently announced PostScript 'clones' that are cheaper to licence than the real thing – so this should bring the cost of PostScript-compatible devices down in time.

The extended control codes on some printers such as the Epson GQ3500 can contain text descriptions, for example circle drawing and floodfilling. But these are not PDLs for two reasons – they aren't a single language to control all text and graphics output, and most of all they are printer specific, which PDLs are not.

The physical aspects of a laser printer are very different from other types of printer, and it is this that causes a lot of people to choose one. The big attraction in the office environment is often not print quality. Laser printers are virtually silent. The loudest sound is usually the cooling fan inside the machine.

All laser printers can only work with cut sheet paper and they are often limited to



Top: The pins of the dot matrix make the image. Bottom: A daisy-wheel creates the image in one go

IMPACT PRINTERS

Dot-matrix and daisy-wheel printers are known collectively as *impact* printers – they create their characters by hitting the paper through an inked ribbon, in exactly the same way as a typewriter. Laser printers and ink-jet printers are *non-impact* printers, as nothing mechanical hits the paper. For this reason, they are quieter than impact printers, and are sometimes more suitable for an office environment.

Dot-matrix designs have a column of pins in the print-head. Some of these fire to create a column of dots on the paper – different combinations of pins for different letters. As the print-head moves across the paper, further columns of dots align to form letters. Usually, there are about 11 columns of dots for each complete letter. The microprocessor in the printer controls the pins, and the printer has a ROM containing the data for which pins should fire for each letter. The diagram above shows the pins just after they have fired to print the central column in an 'i' character.

Daisy-wheel printers are different in that they create each charater in a single strike. The print-head carries a wheel with lots of spokes. Each spoke carries a shaped piece at the end, like the arms of a typewriter. A hammer hits the spoke against the ribbon, impressing the shape of the character onto the paper. For each letter, the printer turns the wheel so that the correct spoke lies under the hammer.

Both types of impact printer print one line of text at a time. The whole print-head moves across the paper, then feeds the paper upwards by a line before returning to print the next line of text.

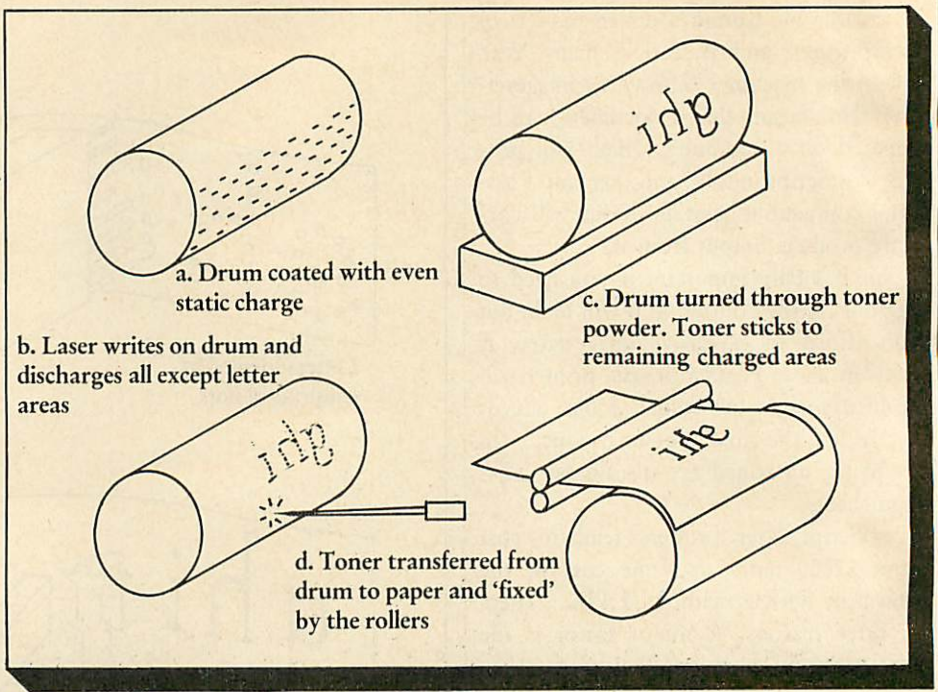
Dot-matrix printers are more flexible than daisy-wheel machines, because the pattern of dots produced by the pins is controlled by software. Change the data in the ROM, and the typeface will change – most machines have more than one ROM installed, so selecting another allows two or more typefaces. On a daisy-wheel, the wheel has to be changed physically before a new typeface can be selected. Also, dot-matrix printers often contain RAM, like sideways RAM in a micro. Fill the RAM with new data and you can use a completely new typeface that you can design yourself.

A4 sheets. The standard feed is from a paper tray, like that in a photocopier, and they typically hold between 50 and 200 sheets of normal A4 typing paper. Another point is that they are fast – laser printers aren't measured in characters per second, but in pages per minute. Standard speeds are six or eight pages per minute, which works out at several hundred characters per second. As with dot-matrix printers, quoted speeds are often rather optimistic, and in particular the printer slows down enormously if it has a lot of graphics to print out. Of course the other reason people prefer a laser printer is due to the increased resolution and crispness of the output – see the example printouts in the box on page 106.

An important point for laser printer users is the running cost. With average use, a dot-matrix printer needs a new ribbon about every thousand pages, and this usually costs about £5. Laser printers use toner cartridges, similar to photocopier cartridges. Some printers use small units, which last for about 1500 copies and cost about £30. The larger Canon cartridge, used by about half a dozen types of printer last for 4000 pages, but cost nearly £100 each. It is possible to get the cartridges refilled, but it isn't easy. Refilling costs about half the cost of buying a new cartridge, but the running costs work out at still about three times that of a dot-matrix or daisy-wheel printer.

The laser mechanism, drum and so on don't have infinite lives either, and they usually require major servicing at about 100,000 pages. I don't think you should worry about that. A busy office is unlikely to print more than 300 pages a week on average which amounts to about seven years of normal use. The point here is that a laser printer can't be used as an alternative to the office photocopier – it gets far too expensive.

If you fancy a new programming challenge, then you too are a good candidate for a laser printer. The control codes and printing commands are confusing to someone used to 30 or 40 codes on a matrix printer – for more on this see the review of the Epson GQ3500 on page 155. Whether using extended control codes or a full-blown page description language, the amount of control you can exercise over the printed output is phenomenal. As the laser printer is a computer in its own right, it is possible to write small programs in PostScript for it. That way, you can directly control all its complex function.



With a laser printer, a laser beam creates the image on a charged drum

LASER PRINTERS

The laser printer works very much like a photocopier, and not at all like other printers. It stores an image of the whole page to be printed in its internal memory. The resolution of the printer is 300 dots per inch, or 90,000 dots per square inch. An A4 page less a small border measures 11 inches by eight inches, so to hold the entire page the memory needs to hold enough dots for 88 square inches, which works out at nearly a megabyte. Most laser printers have just enough internal memory to hold a page of graphics.

To cope with the processing involved in writing the image into the memory and controlling the laser beam, a full microcomputer system is built into the printer. Additional ROM and RAM is needed to store the patterns of the fonts to be used, and the program code and data required to make the whole thing happen. The ROMs containing fonts need to hold very high-resolution detail, and as anyone who has ever written high-resolution graphics programs will know, this requires a lot of data, and 512k or one megabyte of ROM is not uncommon. When the image is set up in memory each '1' in the memory represents a black dot, each '0' means the area should be left white.

For printers without page description languages, a graphics image is downloaded as bytes from the computer rather like a screen dump; text characters are sent as ASCII bytes, and translated internally using the font data. When the memory is set up, the internal processor runs a program which starts a rotating light-sensitive drum. This is evenly charged with 'static' all over. The laser beam is pointed at the drum, scanned across it by revolving mirror, and switched on and off very rapidly, based on the bit pattern in memory. Where it hits the drum, the negative charge is lost. This is a precision operation, which is why a laser must be used.

The drum then turns to roll through the toner powder fitted in the cartridge. The toner is a fine electrically charged powder – it sticks to the drum where there is no charge left, but is repelled by the parts of the drum surface where a charge still exists. This makes a powder image which shows where the laser didn't hit the drum.

As the paper enters the laser printer, it is given an all-over positive charge. The paper then passes on to the drum, which has been prepared with toner. As it passes under the drum, the negatively charged toner particles are attracted from the drum to the paper, and fall on to it. The paper then travels on to heated rollers at about 200 degrees Centigrade, and the toner is bonded to the paper.

At the other end, the paper rolls out onto a tray, and is immediately ready for use. It is best not to rub it for a few seconds to allow it to cool.

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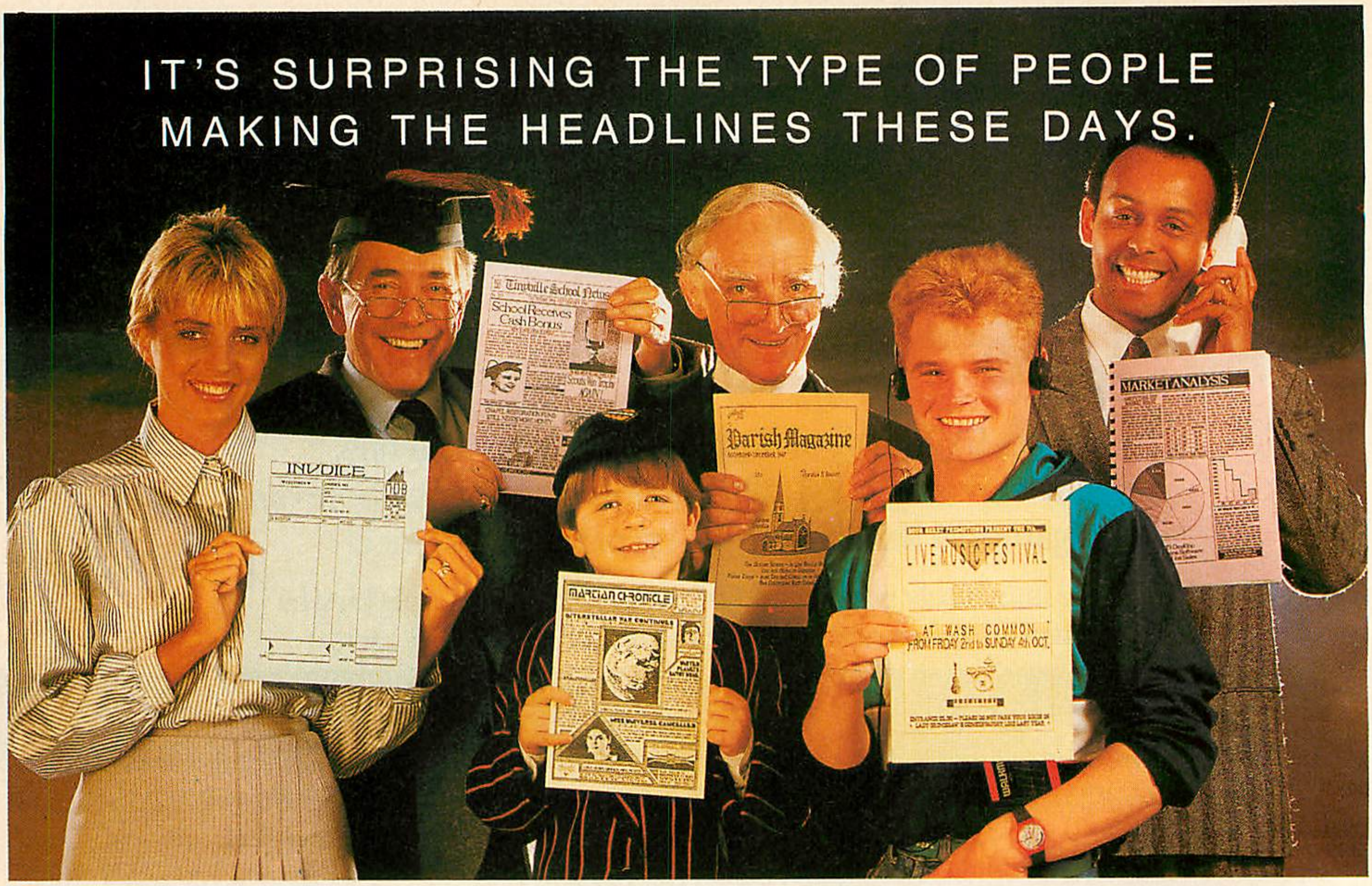
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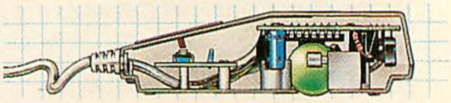
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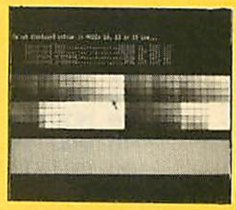
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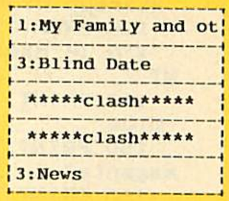
Entering listings

To make the task of entering listings easier, *Acorn User* has adopted several standards in the yellow pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the yellow pages are often listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the yellow pages will help you spot extra or missing characters.

To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1, 2 and 4 (unless stated otherwise) and with operating systems OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering, we provide an easy-to-complete 'How To Enter' box.

Once you've typed in your program, save it to tape or disc then test it by running it. If you have a major problem with a listing, ask someone to check it. If you still have difficulties, you can also send off for a list of *Checksums* which help you find the errors. Send a large sae (26p stamp) to *AU*Checksums, PO Box 641, London NW9 8TF.







DISCS AND TAPES



All the listings on these pages can be found on this month's listings disc or cassette. See page 133 for details of how to order.

BACK ISSUES





For help with entering and debugging listings see the following back issues: April '86, June '85, Aug '84, Sept '83.

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	114											
Listing 1		■	■	■	■	■	■	■	■	■	■	■
Listing 2		■	■	■	■	■	■	■	■	■	■	■
Listings 3		■	■	■	■	■	■	■	■	■	■	■
Acorn Forum	116											
Listing 1							■		■			■
Listing 2		■	■	■	■	■		■	■	■	■	■
Listings 3		■	■	■	■			■	■	■	■	■
Joe's Jottings	119											
Listings1-5		■[1]	■	■	■	■[1]	■[2]	■	■	■	■	■
BBC to Arc Data Link	125											
Listing 1		■	■	■	■	■	■	■	■	■	■	■

Notes: [1] Requires shadow RAM, [2] Requires 6502 emulator

See Hints & Tips, page 39

Listing 1. *View* !Boot file creator

```
   10 REM Hints & Tips 1
   20 REM By Martin Phillips
   30 REM for BBC B/B+/M/C/E
   40 REM (c) Acorn User February 1988
   50 :
   60 name$=""
   70 DIM cli 30
   80 MODE 6
   90 VDU 19,1,2;0;
  100 PRINT TAB(7,1)"View Startup Disc C
reator"
  110 PRINT '"This program will create a
 startup disc"
  120 PRINT "for VIEW"'
  130 IF name$="" THEN PROCload ELSE PRI
NT '
  140 PRINT 'TAB(5)"0. black" TAB(25)"4.
 blue"
  150 PRINT TAB(5)"1. red"   TAB(25)"5.
magenta"
  160 PRINT TAB(5)"2. green" TAB(25)"6.
cyan"
  170 PRINT TAB(5)"3. yellow"TAB(25)"7.
white"
  180 PRINT '"Select background colour "
;
  190 REPEAT
  200 bcol=GET-48
  210 UNTIL bcol>-1 AND bcol<8
  220 PRINT;bcol
  230 PRINT '"Select text colour ";
  240 REPEAT
  250 tcol=GET-48
  260 UNTIL tcol>-1 AND tcol<8 AND tcol<
>bcol
  270 PRINT;tcol
  280 PRINT '"Put a blank formatted disc
 in the disc"
  290 PRINT "drive"
  300 PRINT "Press the space bar when re
ady"
  310 REPEAT UNTIL GET=32
  320 VDU 28,0,24,39,17,12
  330 *OPT 4,3
  340 *SPOOL !BOOT
  350 PRINT "MODE3"
  360 PRINT "MODE131"
  370 PRINT "*WORD"
  380 PRINT "PRINTER "name$
  390 VDU 19,0,bcol;0;
  400 VDU 19,1,tcol;0;
  410 REM Put other instructions here
  420 *SPOOL
  430 PROCoscli("SAVE "+name$+" 3000 +FF
 400")
  440 VDU 12,26
  450 PRINT TAB(0,21)"Create another? (Y
/N)";
  460 REPEAT
  470 g$=CHR$(GET AND 95)
  480 UNTIL g$="Y" OR g$="N"
  490 IF g$="Y" THEN GOTO 80
  500 END
  510 :
  520 DEF PROCload
  530 INPUT '"Enter name of printer driv
er "name$
  540 PROCoscli("LOAD "+name$+" 3000")
  550 ENDPROC
  560 :
  570 DEF PROCoscli($cli)
  580 X%=cli MOD 256
```

Continued ▶

◀ Hints & Tips listing 1 continued

```
  590 Y%=cli DIV 256
  600 CALL &FFF7
  610 ENDPROC
```

Listing 2. Simple disc menu program

```
   10 REM Hints & Tips 2
   20 REM By Martin Phillips
   30 REM For BBC B/B+/M/C/E/A
   40 REM (c) Acorn User February 1988
   50 :
   60 MODE 7
   70 PROCinit
   80 READ title$
   90 PROCdouble(LEFT$(title$,36))
  100 VDU 28,0,23,39,3
  110 PROCread
  120 PROCselect
  130 RUN
  140 :
  150 DEF PROCinit
  160 X%=64
  170 DIM file$(X%),type$(X%),desc$(X%)
  180 DIM cli 30
  190 *FX 4,1
  200 ON ERROR: IF ERR=254 OR ERR=214 THE
N PRINT"File not found.":I=INKEY(300):RU
N:ELSE REPORT:PRINT" at line ";ERL:END
  210 *KEY10 CHAIN"MENU"|M
  220 ENDPROC
  230 :
  240 DEF PROCdouble(A$)
  250 R$=CHR$(129)
  260 G$=CHR$(130)
  270 Y$=CHR$(131)
  280 C$=CHR$(134)
  290 T$=CHR$(141)+G$+A$
  300 x%=(38-LEN(A$))/2
  310 PRINT TAB(x%,0)T$
  320 PRINT TAB(x%,1)T$
  330 ENDPROC
  340 :
  350 DEF PROCread
  360 N%=-1
  370 REPEAT
  380 N%=N%+1
  390 READ file$(N%),type$(N%),desc$(N%)
  400 type$(N%)=LEFT$(type$(N%),1)
  410 desc$(N%)=LEFT$(desc$(N%),35)
  420 UNTIL type$(N%)="*"
  430 N%=N%-1
  440 ENDPROC
  450 :
  460 DEF PROCselect
  470 P%=0
  480 Pmax%=(N% DIV 15)
  490 no%=15
  500 IF P%=Pmax% THEN no%=N% MOD 15
  510 CLS
  520 FOR T%=0 TO no%
  530 PRINT R$;CHR$(65+T%);Y$;" ";desc$(
T%+P%*15)
  540 IF no%<8 THEN PRINT
  550 NEXT T%
  560 IF P%>0 THEN PRINT R$;"[";G$;" Pre
vious selection"
  570 IF P%<Pmax% THEN PRINT R$;"]";G$;"
 Next selection"
  580 PRINT'C$;"Enter letter: ";
```

Continued ▶

◄ Hints & Tips listing 2 continued

```
590 *FX 21,0
600 REPEAT
610 A=GET
620 UNTIL (A>64 AND A<(66+no%)) OR A=1
36 OR A=137
630 *FX 4
640 IF A=136 AND P%>0 THEN P%=P%-1:GOT
O 560
650 IF A=137 AND P%<Pmax% THEN P%=P%+1
:GOTO 560
660 A=A-65+15*P%
670 VDU 26
680 IF type$(A)="C" THEN CHAIN file$(A
)
690 IF type$(A)="R" THEN PROCoscli("RU
N "+file$(A))
700 IF type$(A)="L" THEN PROCoscli("LO
AD "+file$(A))
710 PRINT''C$"Which ROM ID (4-7)? ";
720 REPEAT
730 g$=GET$
740 UNTIL g$>"3" AND g$<"8"
750 PRINT g$
760 IF type$(A)="S" THEN PROCoscli("SR
LOAD "+file$(A)+" 8000 "+g$)
770 ENDPROC
780 :
790 DEF PROCoscli($cli)
800 X%=cli MOD 256
810 Y%=cli DIV 256
820 CALL &FFF7
830 ENDPROC
840 :
850 REM Put title here:
860 DATA Hints & Tips Menu Program
870 :
880 REM Data for each filename in form
890 REM filename,execution,description
900 REM execution: L..*LOAD
910 REM            C..CHAIN
920 REM            R..*RUN
930 REM            S..*SRLOAD
940 DATA ROM1,S,ROM software
950 DATA MCPROG,R,Machine code program
960 DATA PROG,C,Program  description
970 :
2000 REM This line must be last
2010 DATA *,*,*
```

Listing 3. Recursive graphics

```
10 REM Hints & Tips 3
20 REM By Martin Phillips
30 REM For BBC B/B+/M/C/E/A
40 REM (c) Acorn User February 1988
50 :
60 MODE 1
70 VDU 5
80 REPEAT
90 PROCrun
100 UNTIL 0
110 END
120 :
130 DEF PROCrun
140 M%=256
150 REPEAT
160 VDU 19,RND(3),RND(7);0;
170 GCOL 3,RND(3)
180 PROCsquare(640,512,512)
190 M%=M%/2
```

Continued ►

◄ Hits & Tips listing 3 continued

```
200 UNTIL M%<4
210 ENDPROC
220 :
230 DEF PROCsquare(X%,Y%,S%)
240 IF S%<M% THEN ENDPROC
250 S%=S%/2
260 PROCsquare(X%+S%,Y%+S%,S%)
270 PROCsquare(X%+S%,Y%-S%,S%)
280 PROCsquare(X%-S%,Y%+S%,S%)
290 PROCsquare(X%-S%,Y%-S%,S%)
300 VDU 29,X%;Y%;
310 MOVE -S%,-S%
320 DRAW S%,-S%
330 DRAW S%,S%
340 DRAW -S%,S%
350 DRAW -S%,-S%
360 ENDPROC
```

See Acorn Forum, page 49

Listing 1. Archimedes colour selector

```
10 REM Arc Colour Selector
20 REM By Michael Porter
30 REM for Arc only
40 REM (c) Acorn User Feb 88
50 :
60 MODE 15:OFF
70 xbase=0:ybase=448
80 PROCcolour_table(xbase,ybase)
90 PROCsetup_mouse(xbase,ybase)
100 PROCscan(xbase,ybase,0,184,1279,20
0)
110 END
120 :
130 DEF PROCcolour_table(x,y)
140 LOCAL col_code
150 FOR col_code=0 TO 255
160 PROCrect(x,y,col_code)
170 NEXT
180 ENDPROC
190 :
200 DEF PROCrect(xbase,ybase,col_code)
210 GCOL (col_code>>2)AND%111111 TINT
(col_code AND%11)<<6
220 RECTANGLE FILL xbase+(col_code MOD
32)*40,ybase+(col_code AND%100000)*5+(co
l_code DIV&40)*40,40
230 GCOL 0 TINT 0
240 RECTANGLE xbase+(col_code MOD32)*4
0,ybase+(col_code AND%100000)*5+(col_cod
e DIV&40)*40,40
250 ENDPROC
260 :
270 DEF PROCsetup_mouse(x,y)
280 *POINTER
290 MOUSE ON
300 MOUSE RECTANGLE x+2,y+4,1276,312
310 ENDPROC
320 :
330 DEF PROCscan(xbase,ybase,x,y,w,h)
340 LOCAL mx,my,button
350 COLOUR %110
360 PRINT TAB(0,0);"To get displayed c
olour in MODEs 10, 13 or 15 use...";
370 COLOUR %1110
380 PRINT TAB(5,2);"Foreground text...
..............COLOUR XXX TINT XXX"
390 PRINT TAB(5,3);"Background text...
..............COLOUR XXX TINT XXX"
```

Continued ►

◄ **Acorn Forum listing 1 continued**

```
  400 PRINT TAB(5,4);"Foreground graphic
s...............GCOL XXX TINT XXX"
  410 PRINT TAB(5,5);"Background graphic
s...............GCOL XXX TINT XXX"
  420 REPEAT
  430 MOUSE mx,my,button
  440 col=POINT(mx,my):tint=TINT(mx,my)
  450 IF col>0 OR (mx<(xbase+160)ANDmy<(
ybase+40)) THEN
  460 GCOL col TINT tint
  470 PROCinfo(col,tint)
  480 RECTANGLE FILL x,y,w,h
  490 ENDIF
  500 UNTIL FALSE
  510 ENDPROC
  520 :
  530 DEF PROCinfo(col,tint)
  540 LOCAL y
  550 FOR y=2 TO 5
  560 PRINT TAB(54,y);tint;SPC(2)
  570 NEXT
  580 colf$=STR$(col)
  590 colb$=STR$(128+col)
  600 colf$+=STRING$(3-LEN(colf$)," ")
  610 colb$+=STRING$(3-LEN(colb$)," ")
  620 PRINT TAB(45,2);colf$;TAB(45,4);co
lf$
  630 PRINT TAB(45,3);colb$;TAB(45,5);co
lb$
  640 ENDPROC
```

Listing 2. ADFS 'E' attribute deleter

```
   10 REM Undo ADFS E attribute
   20 REM By David Spencer
   30 REM For B/B+/E/M/C with ADFS
   40 REM (c) Acorn User Feb 1988
   50 :
   60 DIM dir &4FF, ws &10
```

Continued ►

◄ **Acorn Forum listing 2 continued**

```
   70 INPUT "Enter start sector or direc
tory name : " N$
   80 S%=EVAL("&"+N$)
   90 PROCgetput (dir,ws,S%,0)
  100 FOR F%=0 TO 46
  110 dir?(F%*26+9)=dir?(F%*26+9) AND &7
F
  120 NEXT
  130 PROCgetput(dir,ws,S%,1)
  140 *DIR @
  150 *ACCESS * WR
  160 END
  170 :
  180 DEF PROCgetput(buffer,temp,sector,
rw)
  190 ?temp=0
  200 temp!1=buffer
  210 IF rw temp?5=10 ELSE temp?5=8
  220 temp?6=sector DIV 65536
  230 temp?7=sector DIV 256
  240 temp?8=sector
  250 temp?9=5
  260 temp?10=0
  270 temp!11=&500
  280 X%=temp MOD &100
  290 Y%=temp DIV &100
  300 A%=&72
  310 CALL &FFF1
  320 IF ?temp PRINT "Disc error &"~?tem
p:STOP
  330 IF rw ENDPROC
  340 FOR F%=1 TO 4
  350 IF buffer?F% <> ASC MID$("Hugo",F%
,1) THEN 390
  360 IF buffer?(F%+1274) <> ASC MID$("H
ugo",F%,1) THEN 390
  370 NEXT
  380 ENDPROC
  390 PRINT "Not a directory"
  400 END
```

Listing 3. Mode 7 sideways scroll

```
   10 REM Sideways Scrol
l Program
   20 REM by Stuart Ogle
sby
   30 REM for B/B+/M/C
   40 REM (c) Acorn User
 Feb 88
   50 :
   60 a=&70
   70 b=&71
   80 linelo=&72
   90 linehi=&73
  100 num=&74
  110 FOR pass=0 TO 3 ST
EP 3
  120 P%=&900
  130 [OPT pass
  140 LDX num
  150 .loop1
  160 LDA #&7C
  170 STA linehi
  180 LDA #0
  190 STA linelo
  200 .nextline
  210 LDA #0
  220 STA linelo
  230 .nextline
  240 LDY #&27
  250 LDA (linelo),Y
  260 STA b
  270 LDY #0
  280 .loop
  290 LDA (linelo),Y
  300 STA a
  310 LDA b
  320 STA (linelo),Y
  330 LDA a
  340 STA b
  350 INY
  360 CPY #&28
  370 BNE loop
  380 CLC
  390 LDA linelo
  400 ADC #&28
  410 STA linelo
  420 LDA linehi
  430 ADC #0
  440 STA linehi
  450 CMP #&7F
  460 BNE nextline
  470 LDA linelo
  480 CMP #&E8
  490 BNE nextline
  500 DEX
  510 BNE loop1
  520 RTS
  530 ]
  540 NEXT
  550 :
  560 MODE 7
  570 FOR I%=0 TO 21
  580 PRINT I%,I%,I%
  590 NEXT
  600 ?&74=40
  610 CALL &900
```

JOE'S JOTTINGS

See Joe's Jottings, page 88

Listing 1. Timetable menu

```
   10 REM TV Timetables menu Prog
   20 REM by Joe Telford
   30 REM for B/E with Shadow RAM/B+/M/C
   40 REM (c) Acorn User February 1988
   50 :
   60 mode=1
   70 MODE mode
   80 PROCsetup
   90 PROCfpage
  100 PROCdouble(5,23,"       PRESS RETURN
 TO BEGIN    ")
  110 INPUT "" dummy$
  120 ON ERROR PROCerr
  130 MODE mode
  140 PROCfpage
  150 REPEAT
  160 CLOSE#0
  170 c%=FNmenu
  180 PROCdecode(c%)
  190 UNTIL c%=4
  200 *FX 4,0
  210 CLS
  220 *BASIC
  230 END
  240 :
  250 DEF PROCsetup
  260 LOCAL loop%
  270 VDU 19,0,4;0;
  280 *FX 4,1
  290 DIM menu$(4),d% 10
  300 ENDPROC
  310 :
  320 DEF PROCdecode(c%)
  330 IF c%=1 THEN CHAIN "!Editor"
  340 IF c%=2 THEN CHAIN "!Table"
  350 IF c%=3 THEN CHAIN "!Clash"
  360 ENDPROC
  370 :
  380 DEF FNmenu
  390 PROCcrsr(0)
  400 GCOL 0,1
  410 *FX 4,1
  420 menu$(1)=" Edit individual Viewer'
s choice "
  430 menu$(2)="      Produce daily Timet
able     "
  440 menu$(3)="          Examine Clashes
     "
  450 menu$(4)="          Return to BASIC
     "
  460 LOCAL menuptr,loop%,min,mx
  470 min=1
  480 mx=4
  490 menuptr=1
  500 REPEAT
  510 FOR loop%=min TO mx
  520 IF loop%=menuptr COLOUR 0:COLOUR 1
35 ELSE COLOUR 7:COLOUR 128
  530 PRINTTAB(4,6+loop%*2);menu$(loop%)
  540 NEXT
  550 COLOUR 7
  560 COLOUR 128
  570 key=GET
  580 IF key=139 menuptr=menuptr-1:IF me
nuptr=min-1 menuptr=mx
  590 IF key=138 menuptr=menuptr+1:IF me
nuptr=mx+1 menuptr=min
  600 UNTIL key=13
  610 *FX 4,0
  620 PROCcrsr(1)
  630 =menuptr
  640 :
  650 DEF PROCfpage
```

Continued ▶

◀ Joe's Jottings listing 1 continued

```
  660 VDU 19,0,4;0;
  670 VDU 26,12
  680 GCOL 0,3
  690 VDU 26,12
  700 PROCr(16,16,1248,160,0)
  710 PROCr(16,844,1248,160,0)
  720 VDU 19,1,6;0;
  730 COLOUR 1
  740 PROCdouble(1,2,"The (Acorn User) T
elevision Timetables")
  750 PROCr(144,208,992,96,0)
  760 PROCdouble(5,28,"Another one of Jo
e's Jottings.")
  770 PRINT TAB(5,23)"Use Cursor ^ and v
 to move bar"
  780 PRINT TAB(5,24)"     Press RETURN t
o select"
  790 ENDPROC
  800 :
  810 DEF PROCcrsr(s)
  820 VDU 23,1,s;0;0;0;
  830 ENDPROC
  840 :
  850 DEF PROCdouble(x,y,t$)
  860 PRINT TAB(x,y);
  870 FOR loop%= 1 TO LENt$
  880 PROCdh(MID$(t$,loop%,1))
  890 NEXT
  900 ENDPROC
  910 :
  920 DEF PROCdh(a$)
  930 ?d%=ASCa$
  940 X%=d% MOD 256
  950 Y%=d% DIV 256
  960 A%=10
  970 CALL &FFF1
  980 VDU 23,128,d%?1,d%?1,d%?2,d%?2,d%?
3,d%?3,d%?4,d%?4,128,10,8,23,128,d%?5,d%
?5,d%?6,d%?6,d%?7,d%?7,d%?8,d%?8,128,11
  990 ENDPROC
 1000 :
 1010 DEF PROCerr
 1020 VDU 3
 1030 CLOSE#0
 1040 IF ERR=17 THEN ENDPROC
 1050 REPORT
 1060 PRINT " ";ERR;" at line ";ERL
 1070 END
 1080 :
 1090 DEF PROCr(x,y,l,w,f)
 1100 MOVE x,y
 1110 IF f=0 DRAW x+l,y   ELSE MOVE x+l
 1120 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w-4
 1130 IF f=1 MOVE x,y+w:MOVE x+l,y+w
 1140 IF f=0 DRAW x,y+w   ELSE PLOT 85,x
+l,y
 1150 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
 1160 ENDPROC
```

Listing 2. Individual viewer editor

```
   10 REM TV Individual viewers editing
program
   20 REM by Joe Telford
   30 REM for B/E with Shadow RAM/B+/M/C
   40 REM (c) Acorn User February 1988
   50 :
   60 mode=1
   70 MODE mode
   80 PROCsetup
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
   90 PROCnew
  100 ON ERROR PROCerr
  110 PROCfpage
  120 REPEAT
  130 CLOSE#0
  140 c%=FNmenu
  150 PROCdecode(c%)
  160 UNTIL c%=8
  170 *FX 4,0
  180 CHAIN "!MENU"
  190 END
  200 :
  210 buffer$(0)=FNgpi(1,0,"1234")
  220 DEF PROCsetup
  230 LOCAL loop%
  240 VDU 19,0,4;0;
  250 F%=0
  260 *FX 4,1
  270 ptr=0
  280 min=0
  290 max=95
  300 fields=3
  310 DIM slot$(max,fields),menu$(8),d%
 10,mem$(1),buffer$(3)
  320 mem$(1)="in use"
  330 mem$(0)="empty."
  340 date$="0101"
  350 name$="JT"
  360 f$=name$+date$
  370 PROCvalid
  380 ENDPROC
  390 :
  400 DEF PROCdecode(c%)
  410 IF c%=1 THEN name$=FNview(c%):ENDP
ROC
  420 IF c%=2 THEN date$=FNdate(c%):ENDP
ROC
  430 IF c%=3 THEN PROCcat:ENDPROC
  440 IF c%=4 THEN PROCload(c%):ENDPROC
  450 IF c%=5 THEN PROCsave(c%):ENDPROC
  460 IF c%=6 THEN PROCedit:ENDPROC
  470 IF c%=7 THEN PROCnew:ENDPROC
  480 ENDPROC
  490 :
  500 DEF PROCedit
  510 CLS
  520 PROCsetscr
  530 PROChilite(ptr)
  540 PROCdisbuff
  550 REPEAT
  560 PROCmove
  570 IF B%=-1 AND (A%=9 OR A%=135) THEN
 PROCloadbuff(ptr):UNTIL 0
  580 IF A%=9 OR A%=135 THEN PROCcopybuf
(ptr):UNTIL 0
  590 IF A%=127 PROCdelslot(ptr):UNTIL 0
  600 IF A%=13 PROCenter
  610 UNTIL 0
  620 :
  630 DEF PROCmove
  640 *FX 4,1
  650 REPEAT
  660 A%=GET
  670 B%=INKEY-1
  680 IF B%=-1 AND A%=136 PROCshiftleft:
UNTIL 0
  690 IF B%=-1 AND A%=137 PROCshiftright
:UNTIL 0
  700 IF A%=139 PROCup :UNTIL 0
  710 IF A%=138 PROCdown :UNTIL 0
  720 IF A%=136 PROCleft :UNTIL 0
  730 IF A%=137 PROCright :UNTIL 0
  740 UNTIL A%=13 OR A%=9 OR A%=135 OR A
%=127
  750 *FX 4
  760 ENDPROC
  770 :
  780 DEF PROCshiftleft
  790 PROChilite(ptr)
  800 ptr=ptr-48
  810 IF ptr<0 THEN ptr=ptr+96
  820 PROChilite(ptr)
  830 ENDPROC
  840 :
  850 DEF PROCshiftright
  860 PROChilite(ptr)
  870 ptr=ptr+48
  880 IF ptr>max THEN ptr=ptr-96
  890 PROChilite(ptr)
  900 ENDPROC
  910 :
  920 DEF PROCright
  930 PROChilite(ptr)
  940 ptr=ptr+1
  950 IF ptr=max+1 THEN ptr=0
  960 PROChilite(ptr)
  970 ENDPROC
  980 :
  990 DEF PROCleft
 1000 PROChilite(ptr)
 1010 ptr=ptr-1
 1020 IF ptr=-1 THEN ptr=max
 1030 PROChilite(ptr)
 1040 ENDPROC
 1050 :
 1060 DEF PROCdown
 1070 PROChilite(ptr)
 1080 ptr=ptr+4
 1090 IF ptr>max THEN ptr=ptr-max-1
 1100 PROChilite(ptr)
 1110 ENDPROC
 1120 :
 1130 DEF PROCup
 1140 PROChilite(ptr)
 1150 ptr=ptr-4
 1160 IF ptr<0 THEN ptr=max+ptr+1
 1170 PROChilite(ptr)
 1180 ENDPROC
 1190 :
 1200 :
 1210 DEF PROChilite(ptr)
 1220 GCOL 4,0
 1230 ypos=ptr DIV 4
 1240 xpos=ptr MOD 4
 1250 IF ypos>11 PROCr(760+128*xpos,888-
(ypos-12)*64,112,48,1)
 1260 IF ypos<12 PROCr(120+128*xpos,888-
ypos*64,112,48,1)
 1270 GCOL 0,1
 1280 ENDPROC
 1290 :
 1300 DEF PROCsetscr
 1310 LOCAL loop%
 1320 VDU 26,12
 1330 PRINT TAB(1,1) "Hr       Daytime"
 1340 PRINT TAB(21,1)"Hr      Nighttime"
 1350 FOR loop%= 0 TO 11
 1360 PROCr(16,1008-64*(loop%+1),1248,64
,0)
 1370 PRINT TAB(1,3+loop%*2);loop%+6;
 1380 FOR field= 0 TO 3
 1390 PRINT TAB(4+field*4,3+loop%*2);slo
t$(loop%*4+field,0)
 1400 NEXT
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
 1410 PRINT TAB(21,3+loop%*2);loop%+6;
 1420 FOR field= 0 TO 3
 1430 PRINT TAB(24+field*4,3+loop%*2);sl
ot$((12+loop%)*4+field,0);
 1440 NEXT
 1450 NEXT
 1460 PROCr(16,176,1248,832,0)
 1470 PROCr(16,176,96,832,0)
 1480 PROCr(656,176,96,832,0)
 1490 FOR loop%=0 TO 3
 1500 PROCr(112+128*loop%,176,128,768,0)
 1510 PROCr(752+128*loop%,176,128,768,0)
 1520 NEXT
 1530 ENDPROC
 1540 :
 1550 DEF PROCpslot(ptr)
 1560 ypos=ptr DIV 4
 1570 xpos=ptr MOD 4
 1580 IF ypos>11 THEN PRINTTAB(24+xpos*4
,3+(ypos-12)*2);slot$(ptr,0)
 1590 IF ypos<12 THEN PRINTTAB(4+xpos*4,
3+ypos*2);slot$(ptr,0)
 1600 ENDPROC
 1610 :
 1620 DEF PROCdelslot(ptr)
 1630 FOR field=0 TO fields
 1640 slot$(ptr,field)="    "
 1650 NEXT
 1660 PROChilite(ptr)
 1670 PROCpslot(ptr)
 1680 PROChilite(ptr)
 1690 F%=1
 1700 ENDPROC
 1710 :
 1720 DEF PROCcopybuf(ptr)
 1730 FOR field=0 TO fields
 1740 slot$(ptr,field)=buffer$(field)
 1750 NEXT
 1760 PROChilite(ptr)
 1770 PROCpslot(ptr)
 1780 PROChilite(ptr)
 1790 F%=1
 1800 ENDPROC
 1810 :
 1820 DEF PROCloadbuff(ptr)
 1830 FOR field=0 TO fields
 1840 buffer$(field)=slot$(ptr,field)
 1850 NEXT
 1860 PROCdisbuff
 1870 ENDPROC
 1880 :
 1890 DEF PROCenter
 1900 VDU 28,0,31,39,27,12
 1910 REPEAT
 1920 PRINT TAB(0,0);"channel (1-4): ";
 1930 REPEAT
 1940 UNTIL LENbuffer$(0)=1
 1950 PRINT TAB(18,0);"Prog: ";
 1960 buffer$(1)=FNgpi(16,0,all$)
 1970 PRINT TAB(0,2);"Start time: ";
 1980 buffer$(2)=FNgpi(5,0,"0123456789."
 1990 PRINT TAB(18,2);"Stop time: ";
 2000 buffer$(3)=FNgpi(5,0,"0123456789."
)
 2010 REPEAT
 2020 PRINT TAB(0,4);" These details cor
rect? ";
 2030 yn$=FNgpi(1,0,"YN")
 2040 UNTIL LENyn$=1
 2050 UNTIL yn$="Y"
 2060 VDU 12,26
 2070 PROCdisbuff
 2080 ENDPROC
 2090 :
 2100 DEF PROCdisbuff
 2110 VDU 28,0,31,39,27,12
 2120 PRINT TAB(0,0);"Chnl: ";buffer$(0)
;"  Prog: ";buffer$(1)
 2130 PRINT "From: "buffer$(2)" - "buffe
r$(3)
 2140 PRINT "Date: "date$"    Viewer: "na
me$
 2150 PRINT '" ENTER / COPY / SHFTCOPY /
DELETE / ESC";
 2160 VDU 26
 2170 ENDPROC
 2180 COLOUR 128
 2190 :
 2200 DEF PROCnew
 2210 LOCAL loop%
 2220 FOR loop%=0 TO max
 2230 FOR field= 0 TO fields
 2240 slot$(loop%,field)="    "
 2250 NEXT,
 2260 F%=0
 2270 ENDPROC
 2280 :
 2290 DEF FNview(c%)
 2300 LOCAL name$
 2310 REPEAT
 2320 PRINT TAB(31,4+c%*2);
 2330 name$=FNgpi(2,0,cap$)
 2340 UNTIL LENname$=2
 2350 f$=name$+date$
 2360 =name$
 2370 :
 2380 DEF FNdate(c%)
 2390 LOCAL date$
 2400 REPEAT
 2410 PRINT TAB(29,4+c%*2);
 2420 date$=FNgpi(4,0,"0123456789")
 2430 UNTIL LENdate$=4
 2440 f$=name$+date$
 2450 =date$
 2460 :
 2470 DEF PROCload(c%)
 2480 ch%=OPENINf$
 2490 IF ch%=0 THEN PROCmess(c%,"Can't f
ind "+f$+"- Hit RETURN"):ENDPROC
 2500 PRINT TAB(6,4+c%*2);" Loading ";f$
;" ************     "
 2510 stars=12
 2520 FOR slot=0 TO 95
 2530 IF (slot DIV 8) * 8 = slot PRINTTA
B(6,4+c%*2);" Loading ";f$;" ";STRING$(s
tars,"*");STRING$(12-stars," ");:stars=s
tars-1
 2540 FOR field= 0 TO fields
 2550 INPUT# ch%,slot$(slot,field)
 2560 NEXT,
 2570 PRINT TAB(6,4+c%*2);" Loading ";f$
;"     "
 2580 CLOSE# ch%
 2590 F%=1
 2600 ENDPROC
 2610 :
 2620 DEF PROCsave(c%)
 2630 IF F%=0 THEN PROCmess(c%,"No Timet
able!    - Hit RETURN"):ENDPROC
 2640 ch%=OPENINf$
 2650 CLOSE# ch%
 2660 IF ch%<>0 THEN PROCmess(c%,f$+" ex
ists! continue(Y/N)?"):IF A$<>"Y" ENDPRO
C
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
2670 ch%=OPENOUTf$
2680 PRINT TAB(6,4+c%*2);" Saving ";f$;" ************     "
2690 stars=12
2700 FOR slot=0 TO 95
2710 IF (slot DIV 8) * 8 = slot PRINTTAB(6,4+c%*2);" Saving ";f$;" ";STRING$(stars,"*");STRING$(12-stars," ");:stars=stars-1
2720 FOR field= 0 TO fields
2730 PRINT# ch%,slot$(slot,field)
2740 NEXT,
2750 PRINT TAB(6,4+c%*2);" Saving ";f$;"      "
2760 CLOSE# ch%
2770 F%=1
2780 ENDPROC
2790 :
2800 DEF PROCmess(c%,t$)
2810 COLOUR 0
2820 COLOUR 135
2830 PRINT TAB(6,4+c%*2);t$
2840 COLOUR 128
2850 COLOUR 7
2860 REPEAT
2870 A$=CHR$(GET AND 223)
2880 UNTIL A$>CHR$(12)
2890 ENDPROC
2900 :
2910 DEF PROCcat
2920 PROCcrsr(0)
2930 VDU 26,12
2940 *CAT
2950 PRINT TAB(0,0);STRING$(120," ")
2960 PROCdouble(4,1,"Press RETURN to go back to menu!")
2970 REPEAT UNTIL GET = 13
2980 PROCcrsr(1)
2990 VDU 12,26
3000 PROCfpage
3010 ENDPROC
3020 :
3030 DEF FNmenu
3040 PROCcrsr(0)
3050 GCOL 0,1
3060 *FX 4,1
3070 menu$(1)=" Specify Viewer    ("+name$+") "
3080 menu$(2)=" Set Date              ("+date$+") "
3090 menu$(3)=" Catalogue Disc      "
3100 menu$(4)=" Load Timetable      ("+f$+") "
3110 menu$(5)=" Save Timetable      ("+f$+") "
3120 menu$(6)=" Edit Timetable      "
3130 menu$(7)=" Clear memory        ("+mem$(F%)+") "
3 40 menu$(8)=" Return to MAIN MENU      "
3150 LOCAL menuptr,loop%,min,mx
3160 min=1
3170 mx=8
3180 menuptr=1
3190 REPEAT
3200 FOR loop%=min TO mx
3210 IF loop%=menuptr COLOURO:COLOUR135 ELSE COLOUR7:COLOUR 128
3220 PRINT TAB(6,4+loop%*2);menu$(loop%):NEXT
3230 COLOUR 7
3240 key=GET
3250 IF key=139 menuptr=menuptr-1:IF menuptr=min-1 menuptr=mx
3260 IF key=138 menuptr=menuptr+1:IF menuptr=mx+1 menuptr=min
3270 UNTIL key=13
3280 *FX 4,0
3290 PROCcrsr(1)
3300 =menuptr
3310 :
3320 DEF PROCfpage
3330 VDU 19,0,4;0;
3340 VDU 26,12
3350 GCOL 0,3
3360 VDU 26,12
3370 PROCr(16,16,1248,160,0)
3380 PROCr(16,844,1248,160,0)
3390 VDU 19,1,6;0;
3400 COLOUR 1
3410 PROCdouble(6,2,"Television Timetable Editor ")
3420 PROCr(144,208,992,96,0)
3430 PROCdouble(5,28,"Another one of Joe's Jottings.")
3440 PRINT TAB(5,23)"Use Cursor ^ and v to move bar"
3450 PRINT TAB(5,24)"    Press RETURN to select"
3460 ENDPROC
3470 :
3480 DEF PROCcrsr(s)
3490 VDU 23,1,s;0;0;0;
3500 ENDPROC
3510 :
3520 DEF PROCdouble(x,y,t$)
3530 PRINT TAB(x,y);
3540 FOR loop%= 1 TO LENt$
3550 PROCdh(MID$(t$,loop%,1))
3560 NEXT
3570 ENDPROC
3580 :
3590 DEF PROCdh(a$)
3600 ?d%=ASCa$
3610 X%=d% MOD 256
3620 Y%=d% DIV 256
3630 A%=10
3640 CALL &FFF1
3650 VDU 23,128,d%?1,d%?1,d%?2,d%?2,d%?3,d%?3,d%?4,d%?4,128,10,8,23,128,d%?5,d%?5,d%?6,d%?6,d%?7,d%?7,d%?8,d%?8,128,11
3660 ENDPROC
3670 :
3680 DEF PROCerr
3690 CLOSE#0
3700 IF ERR=17 THEN ENDPROC
3710 REPORT
3720 PRINT " ";ERR;" at line ";ERL
3730 END
3740 :
3750 DEF FNgpi(len,effect,valid$)
3760 PROCcrsr(1)
3770 LOCAL a$,b
3780 a$=""
3790 PRINT STRING$(len,".");STRING$(len,CHR$(8));:*FX21,0
3800 b=GET
3810 IF b=13 THEN PROCcrsr(0):=a$
3820 IF b=127 AND a$="" THEN 3800
3830 IF b=127 a$=LEFT$(a$,LEN(a$)-1):PRINT CHR$b;".";CHR$(8);:GOTO 3800
3840 IF effect=0 THEN 3870
3850 IF effect=1 b=b AND 223 ELSE b=b OR 32
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
 3860 IF effect=3 AND(RIGHT$(a$,1)=" " O
R a$="") b=b AND 223
 3870 IF LEN(a$)=len OR INSTR(valid$,CHR
$b)=0 VDU 7:GOTO 3800
 3880 PRINT CHR$b;:a$=a$+CHR$b:GOTO 3800
 3890 :
 3900 DEF PROCvalid
 3910 cap$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
 3920 low$=" abcdefghijklmnopqrstuvwxyz"
 3930 nos$=".0123456789"
 3940 pun$="-!#$%&'()=?/*:+;.,<>"+CHR$34
 3950 all$=cap$+low$+nos$+pun$
 3960 ENDPROC
 3970 :
 3980 DEF PROCr(x,y,l,w,f)
 3990 MOVE x,y
 4000 IF f=0 DRAW x+1,y   ELSE MOVE x+1,
y
 4010 IF f=0 DRAW x+1,y+w ELSE PLOT 85,x
,y+w-4
 4020 IF f=1 MOVE x,y+w:MOVE x+1,y+w
 4030 IF f=0 DRAW x,y+w   ELSE PLOT 85,x
+1,y+4
 4040 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
 4050 ENDPROC
```

Listing 3. Daily timetable creator

```
   10 REM TV Daily Timetabler
   20 REM by Joe Telford
   30 REM for B/E with Shadow RAM/B+/M/C
   40 REM (c) Acorn User February 1988
   50 :
   60 mode=1
   70 MODE mode
   80 PROCsetup
   90 ON ERROR PROCerr
  100 MODE mode
  110 PROCfpage
  120 REPEAT
  130 CLOSE#0
  140 c%=FNmenu
  150 IF c%=5 OR c%=6 THEN MODE 0
  160 PROCdecode(c%)
  170 IF c%=5 OR c%=6 THEN MODE mode:PRO
Cfpage
  180 UNTIL c%=7
  190 *FX 4,0
  200 CHAIN "!MENU"
  210 END
  220 :
  230 DEF PROCsetup
  240 LOCAL loop%
  250 VDU 19,0,4;0;
  260 F%=0
  270 *FX 4,1
  280 ptr=0
  290 min=0
  300 max=95
  310 fields=3
  320 DIM name$(4),f$(4),menu$(7),d% 10,
view$(1),ch%(5)
  330 DIM b$(4),c$(4)
  340 view$(0)="unset"
  350 view$(1)=" set "
  360 FOR loop%=0 TO 4
  370 name$(loop%)="JT"
  380 f$(loop%)="JT0101"
  390 NEXT
  400 date$="0101"
```

Continued ▶

◀ **Joe's Jottings listing 3 continued**

```
  410 vno=0
  420 PROCvalid
  430 ENDPROC
  440 :
  450 DEF PROCdecode(c%)
  460 IF c%=1 THEN PROCviewers
  470 IF c%=2 THEN date$=FNdate(c%)
  480 IF c%=3 THEN RUN
  490 IF c%=4 THEN PROCcat
  500 IF c%=5 THEN PROCtt(3)
  510 IF c%=6 THEN PROCtt(2)
  520 ENDPROC
  530 :
  540 DEF PROCtt(stream)
  550 LOCAL loop%
  560 PROCdouble(30,1,"Please wait - Ope
ning Files")
  570 PRINT'''
  580 ok=TRUE
  590 CLOSE#0
  600 FOR loop%= 0 TO vno-1
  610 ch%(loop%)=OPENIN(f$(loop%))
  620 IF ch%(loop%)=0 THEN PROCdouble(30
,VPOS,"File "+f$(loop%)+" not found"):PR
INT':ok=FALSE
  630 NEXT
  640 IF NOTok THEN PROCret:ENDPROC
  650 CLS
  660 VDU stream
  670 PRINT "TV Timetable for Date: ";LE
FT$(date$,2);":";MID$(date$,3,2)
  680 PROCline
  690 PRINT "|Hr|.00                |.15
         |.30                |.45
         |";
  700 IF stream=2 THEN PRINT
  710 PROCline
  720 FOR slot=min TO max STEP4
  730 hr=((slot DIV 4)+6)MOD 24
  740 IF hr<10 THEN hr$="0"+STR$(hr) ELS
E hr$=STR$(hr)
  750 PRINT "|";hr$;"|";
  760 FOR quarter= 0 TO 3
  770 a$=""
  780 FOR loop%= 0 TO vno-1
  790 INPUT# ch%(loop%),b$(loop%),c$(loo
p%),d$,e$
  800 IF INSTR(a$,b$(loop%))=0 AND LEFT$
(b$(loop%),1)<>" "THEN a$=a$+b$(loop%)+"
:"
  810 NEXT
  820 IF LENa$>2 THEN a$=" *****clash***
**"
  830 IF a$<>"" THEN PROCprogname
  840 IF a$="" THEN a$=STRING$(18," ")
  850 PRINT a$;STRING$(18-LENa$," ");"|"
;
  860 NEXT
  870 IF stream=2 THEN PRINT
  880 IF stream=2 THEN PROCline
  890 NEXT
  900 VDU 3
  910 FOR loop%=0 TO vno-1
  920 CLOSE# ch%(loop%)
  930 NEXT
  940 IF stream=3 THEN PROCline
  950 PRINT '"Press RETURN to go back to
 the Timetable menu.";
  960 REPEAT UNTIL GET=13
  970 ENDPROC
  980 :
  990 DEF PROCprogname
 1000 LOCAL loop%
```

Continued ▶

JOE'S JOTTINGS

◄ **Joe's Jottings listing 3 continued**

```
 1010 FOR loop%=0 TO vno-1
 1020 IF b$(loop%)=LEFT$(a$,1) THEN a$=a
$+LEFT$(c$(loop%),16):loop%=vno-1
 1030 NEXT
 1040 ENDPROC
 1050 :
 1060 DEF PROCline
 1070 PRINT "+--+------------------+----
--------------+-----------------+-------
------------+";
 1080 IF stream=2 THEN PRINT
 1090 ENDPROC
 1100 :
 1110 DEF PROCret
 1120 PROCdouble(30,20,"PRESS RETURN TO
CONTINUE")
 1130 REPEAT UNTIL GET=13
 1140 ENDPROC
 1150 :
 1160 DEF PROCviewers
 1170 VDU 28,0,21,39,6,12
 1180 LOCAL loop%,name$
 1190 PROCdouble(16,0,"Viewers")
 1200 REPEAT
 1210 PRINT TAB(10,3);"How many Viewers?
";
 1220 vno=VAL(FNgpi(1,0,"2345"))
 1230 UNTIL vno>0
 1240 FOR loop%= 0 TO vno-1
 1250 REPEAT
 1260 PRINT TAB(13,5+loop%*2);"Viewer ";
loop%+1;": ";
 1270 name$(loop%)=FNgpi(2,0,cap$)
 1280 UNTIL name$(loop%)>"" AND LEN(name
$(loop%))=2
 1290 NEXT
 1300 PROCsetfiles
 1310 F%=1
 1320 VDU 12,26
 1330 ENDPROC
 1340 :
 1350 DEF PROCsetfiles
 1360 FOR loop%=0 TO 4
 1370 f$(loop%)=name$(loop%)+date$
 1380 NEXT
 1390 ENDPROC
 1400 :
 1410 DEF FNdate(c%)
 1420 LOCAL date$
 1430 REPEAT
 1440 PRINT TAB(29,5+c%*2);
 1450 date$=FNgpi(4,0,"0123456789")
 1460 UNTIL date$>"" AND LENdate$=4
 1470 PROCsetfiles
 1480 =date$
 1490 :
 1500 DEF PROCcat
 1510 PROCcrsr(0)
 1520 VDU 26,12
 1530 *CAT
 1540 PRINT TAB(0,0);STRING$(120," ")
 1550 PROCdouble(4,1,"Press RETURN to go
back to menu!")
 1560 REPEAT UNTIL GET=13
 1570 PROCcrsr(1)
 1580 VDU 12,26
 1590 PROCfpage
 1600 ENDPROC
 1610 :
 1620 DEF FNmenu
 1630 PROCcrsr(0)
 1640 GCOL 0,1
 1650 *FX 4,1
 1660 menu$(1)=" Specify Viewers     ("+
view$(F%)+") "
 1670 menu$(2)=" Set Date            ("
+date$+") "
 1680 menu$(3)=" Reset Everything
  "
 1690 menu$(4)=" Catalogue Disc
  "
 1700 menu$(5)=" Timetable on screen
  "
 1710 menu$(6)=" Timetable on Printer
  "
 1720 menu$(7)=" Return to MAIN MENU
  "
 1730 LOCAL menuptr,loop%,min,mx
 1740 min=1:mx=7
 1750 menuptr=1
 1760 REPEAT
 1770 FOR loop%=min TO mx
 1780 IF loop%=menuptr COLOUR 0:COLOUR 1
35 ELSE COLOUR 7:COLOUR 128
 1790 PRINT TAB(6,5+loop%*2);menu$(loop%
)
 1800 NEXT
 1810 COLOUR 7
 1820 COLOUR 128
 1830 key=GET
 1840 IF key=139 menuptr=menuptr-1:IF me
nuptr=min-1 menuptr=mx
 1850 IF key=138 menuptr=menuptr+1:IF me
nuptr=mx+1 menuptr=min
 1860 UNTIL key=13
 1870 *FX 4,0
 1880 PROCcrsr(1)
 1890 =menuptr
 1900 :
 1910 DEF PROCfpage
 1920 VDU 19,0,4;0;
 1930 VDU 26,12
 1940 GCOL 0,3
 1950 VDU 26,12
 1960 PROCr(16,16,1248,160,0)
 1970 PROCr(16,844,1248,160,0)
 1980 VDU 19,1,6;0;
 1990 COLOUR 1
 2000 PROCdouble(3,2,"Daily Television T
imetable Program")
 2010 PROCr(144,208,992,96,0)
 2020 PROCdouble(5,28,"Another one of Jo
e's Jottings.")
 2030 PRINT TAB(5,23)"Use Cursor ^ and v
 to move bar"
 2040 PRINT TAB(5,24)"     Press RETURN t
o select"
 2050 ENDPROC
 2060 :
 2070 DEF PROCcrsr(s)
 2080 VDU 23,1,s;0;0;0;
 2090 ENDPROC
 2100 :
 2110 DEF PROCdouble(x,y,t$)
 2120 PRINT TAB(x,y);
 2130 FOR loop%= 1 TO LENt$
 2140 PROCdh(MID$(t$,loop%,1))
 2150 NEXT
 2160 ENDPROC
 2170 :
 2180 DEF PROCdh(a$)
 2190 ?d%=ASC a$
 2200 X%=d% MOD 256
 2210 Y%=d% DIV 256
 2220 A%=10
 2230 CALL &FFF1
```

Continued ►

JOE'S JOTTINGS

◀ **Joe's Jottings listing 3 continued**

```
 2240 VDU 23,128,d%?1,d%?1,d%?2,d%?2,d%?
3,d%?3,d%?4,d%?4,128,10,8,23,128,d%?5,d%
?5,d%?6,d%?6,d%?7,d%?7,d%?8,d%?8,128,11
 2250 ENDPROC
 2260 :
 2270 DEF PROCerr
 2280 VDU 3
 2290 CLOSE#0
 2300 IF ERR=17 THEN ENDPROC
 2310 REPORT
 2320 PRINT " ";ERR;" at line ";ERL
 2330 END
 2340 :
 2350 DEF FNgpi(len,effect,valid$)
 2360 PROCcrsr(1)
 2370 LOCAL a$,b
 2380 a$=""
 2390 PRINT STRING$(len,".");STRING$(len
,CHR$(8));:*FX21,0
 2400 b=GET
 2410 IF b=13  THEN PROCcrsr(0):=a$
 2420 IF b=127 AND a$="" THEN 2400
 2430 IF b=127 a$=LEFT$(a$,LEN(a$)-1):PR
INT CHR$b;".";CHR$(8);:GOTO 2400
 2440 IF effect=0 THEN 2470
 2450 IF effect=1 b=b AND 223 ELSE b=b O
R 32
 2460 IF effect=3 AND(RIGHT$(a$,1)=" " O
R a$="") b=b AND 223
 2470 IF LEN(a$)=len OR INSTR(valid$,CHR
$b)=0 VDU 7:GOTO 2400
 2480 PRINT CHR$b;:a$=a$+CHR$b:GOTO 2400
 2490 :
 2500 DEF PROCvalid
 2510 cap$=" ABCDEFGHIJKLMNOPQRSTUVWXYZ"
 2520 low$=" abcdefghijklmnopqrstuvwxyz"
 2530 nos$=".0123456789"
 2540 pun$="-!#$%&'()=?/*:+;.,<>"+CHR$34
 2550 all$=cap$+low$+nos$+pun$
 2560 ENDPROC
 2570 :
 2580 DEF PROCr(x,y,l,w,f)
 2590 MOVE x,y
 2600 IF f=0 DRAWx+l,y   ELSE MOVE x+l
 2610 IF f=0 DRAWx+l,y+w ELSE PLOT 85,x,
y+w-4
 2620 IF f=1 MOVE x,y+w:MOVE x+l,y+w
 2630 IF f=0 DRAW x,y+w  ELSE PLOT 85,x+
l,y
 2640 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
 2650 ENDPROC
```

Listing 4. Clash table creator

```
   10 REM TV Clash Table producer
   20 REM by Joe Telford
   30 REM for B/E with Shadow RAM/B+/M/C
   40 REM (c) Acorn User February 1988
   50 :
   60 mode=1
   70 MODE mode
   80 PROCsetup
   90 ON ERROR PROCerr
  100 MODE mode
  110 PROCfpage
  120 REPEAT
  130 CLOSE#0
  140 c%=FNmenu
  150 IF c%=5 OR c%=6 THEN MODE 0
  160 PROCdecode(c%)
```

Continued ▶

◀ **Joe's Jottings listing 4 continued**

```
  170 IF c%=5 OR c%=6 THEN MODE mode:PRO
Cfpage
  180 UNTIL c%=7
  190 *FX 4,0
  200 CHAIN "!MENU"
  210 END
  220 :
  230 DEF PROCsetup
  240 LOCAL loop%
  250 VDU 19,0,4;0;
  260 F%=0
  270 *FX 4,1
  280 ptr=0
  290 min=0
  300 max=95
  310 fields=3
  320 DIM name$(4),f$(4),menu$(7),d% 10,
view$(1),ch%(5)
  330 view$(0)="unset"
  340 view$(1)=" set "
  350 FOR loop%= 0 TO 4
  360 name$(loop%)="JT"
  370 f$(loop%)="JT0101"
  380 NEXT
  390 date$="0101"
  400 vno=0
  410 PROCvalid
  420 ENDPROC
  430 :
  440 DEF PROCdecode(c%)
  450 IF c%=1 THEN PROCviewers
  460 IF c%=2 THEN date$=FNdate(c%)
  470 IF c%=3 THEN RUN
  480 IF c%=4 THEN PROCcat
  490 IF c%=5 THEN PROCclash(3)
  500 IF c%=6 THEN PROCclash(2)
  510 ENDPROC
  520 :
  530 DEF PROCclash(stream)
  540 LOCAL loop%
  550 PROCdouble(30,1,"Please wait - Ope
ning Files")
  560 PRINT '''
  570 ok=TRUE
  580 CLOSE#0
  590 FOR loop%=0 TO vno-1
  600 ch%(loop%)=OPENIN(f$(loop%))
  610 IF ch%(loop%)=0 THEN PROCdouble(30
,VPOS,"File "+f$(loop%)+" not found"):PR
INT':ok=FALSE
  620 NEXT
  630 IF NOTok THEN PROCret:ENDPROC
  640 CLS
  650 VDU stream
  660 PRINT "TV Clash Table for Date: ";
LEFT$(date$,2);":";MID$(date$,3,2)
  670 PROCline
  680 PRINT "|Hr|.00            |.15
        |.30            |.45
|"
  690 PROCline
  700 FOR slot=min TO max STEP4
  710 hr=((slot DIV 4)+6)MOD 24
  720 IF hr<10 THEN hr$="0"+STR$(hr) ELS
E hr$=STR$(hr)
  730 PRINT "|";hr$;"|";
  740 FOR quarter=0 TO 3
  750 a$=""
  760 FOR loop%=0 TO vno-1
  770 INPUT# ch%(loop%),b$
  780 FOR field=1 TO 3
  790 INPUT# ch%(loop%),dummy$
  800 NEXT
```

Continued ▶

◀ Joe's Jottings listing 4 continued

```
 810 IF INSTR(a$,b$)=0 AND LEFT$(b$,1)<
>" "THEN a$=a$+name$(loop%)+b$
 820 NEXT
 830 IF LENa$=3 THEN a$=STRING$(15," ")
 840 PRINT a$;STRING$(15-LENa$," ");"|"
;
 850 NEXT
 860 PRINT
 870 IF stream=2 THEN PROCline
 880 NEXT
 890 VDU 3
 900 FOR loop%=0 TO vno-1
 910 CLOSE# ch%(loop%)
 920 NEXT
 930 IF stream=3 THEN PROCline
 940 PRINT '"Press RETURN to go back to
 the clash menu."
 950 REPEAT UNTIL GET=13
 960 ENDPROC
 970 :
 980 DEF PROCline
 990 PRINT "+--+---------------+-------
---------+--------------+---------------
+"
 1000 ENDPROC
 1010 :
 1020 DEF PROCret
 1030 PROCdouble(30,20,"PRESS RETURN TO
CONTINUE")
 1040 REPEAT UNTIL GET=13
 1050 ENDPROC
 1060 :
 1070 DEF PROCviewers
 1080 VDU 28,0,21,39,6,12
 1090 LOCAL loop%,name$
 1100 PROCdouble(16,0,"Viewers")
 1110 REPEAT
 1120 PRINT TAB(10,3);"How many Viewers?
";
 1130 vno=VAL(FNgpi(1,0,"2345"))
 1140 UNTIL vno>0
 1150 FOR loop%= 0 TO vno-1
 1160 REPEAT
 1170 PRINT TAB(13,5+loop%*2);"Viewer ";
loop%+1;": ";
 1180 name$(loop%)=FNgpi(2,0,cap$)
 1190 UNTIL name$(loop%)>"" AND LEN(name
$(loop%))=2
 1200 NEXT
 1210 PROCsetfiles
 1220 F%=1
 1230 VDU 12,26
 1240 ENDPROC
 1250 :
 1260 DEF PROCsetfiles
 1270 FOR loop%=0 TO 4
 1280 f$(loop%)=name$(loop%)+date$
 1290 NEXT
 1300 ENDPROC
 1310 :
 1320 DEF FNdate(c%)
 1330 LOCAL date$
 1340 REPEAT
 1350 PRINT TAB(29,5+c%*2);
 1360 date$=FNgpi(4,0,"0123456789")
 1370 UNTIL date$>"" AND LENdate$=4
 1380 PROCsetfiles
 1390 =date$
 1400 :
 1410 DEF PROCcat
 1420 PROCcrsr(0)
 1430 VDU 26,12
 1440 *CAT
 1450 PRINT TAB(0,0);STRING$(120," ")
 1460 PROCdouble(4,1,"Press RETURN to go
back to menu!")
 1470 REPEAT UNTIL GET=13
 1480 PROCcrsr(1)
 1490 VDU 12,26
 1500 PROCfpage
 1510 ENDPROC
 1520 :
 1530 DEF FNmenu
 1540 PROCcrsr(0)
 1550 GCOL 0,1
 1560 *FX 4,1
 1570 menu$(1)=" Specify Viewers      ("+
view$(F%)+") "
 1580 menu$(2)=" Set Date             ("
+date$+") "
 1590 menu$(3)=" Reset Everything
  "
 1600 menu$(4)=" Catalogue Disc
  "
 1610 menu$(5)=" Clash to screen
  "
 1620 menu$(6)=" Clash to printer
  "
 1630 menu$(7)=" Return to MAIN MENU
  "
 1640 LOCAL menuptr,loop%,min,mx
 1650 min=1:mx=7
 1660 menuptr=1
 1670 REPEAT
 1680 FOR loop%=min TO mx
 1690 IF loop%=menuptr COLOUR 0:COLOUR 1
35 ELSE COLOUR 7:COLOUR 128
 1700 PRINT TAB(6,5+loop%*2);menu$(loop%
)
 1710 NEXT
 1720 COLOUR 7
 1730 COLOUR 128
 1740 key=GET
 1750 IF key=139 menuptr=menuptr-1:IF me
nuptr=min-1 menuptr=mx
 1760 IF key=138 menuptr=menuptr+1:IF me
nuptr=mx+1 menuptr=min
 1770 UNTIL key=13
 1780 *FX 4,0
 1790 PROCcrsr(1)
 1800 =menuptr
 1810 :
 1820 DEF PROCfpage
 1830 VDU 19,0,4;0;
 1840 VDU 26,12
 1850 GCOL 0,3:VDU 26,12
 1860 PROCr(16,16,1248,160,0)
 1870 PROCr(16,844,1248,160,0)
 1880 VDU 19,1,6;0;
 1890 COLOUR 1
 1900 PROCdouble(3,2,"Television Timetab
le Clash Program")
 1910 PROCr(144,208,992,96,0)
 1920 PROCdouble(5,28,"Another one of Jo
e's Jottings.")
 1930 PRINT TAB(5,23)"Use Cursor ^ and v
 to move bar"
 1940 PRINT TAB(5,24)"    Press RETURN t
o select"
 1950 ENDPROC
 1960 :
 1970 DEF PROCcrsr(s)
 1980 VDU 23,1,s;0;0;0;
 1990 ENDPROC
 2000 :
 2010 DEF PROCdouble(x,y,t$)
 2020 PRINT TAB(x,y);
```

Continued ▶

◀ Joe's Jottings listing 4 continued

```
2030 FOR loop%=1 TO LENt$
2040 PROCdh(MID$(t$,loop%,1))
2050 NEXT
2060 ENDPROC
2070 :
2080 DEF PROCdh(a$)
2090 ?d%=ASC a$
2100 X%=d% MOD 256
2110 Y%=d% DIV 256
2120 A%=10
2130 CALL&FFF1
2140 VDU 23,128,d%?1,d%?1,d%?2,d%?2,d%?
3,d%?3,d%?4,d%?4,128,10,8,23,128,d%?5,d%
?5,d%?6,d%?6,d%?7,d%?7,d%?8,d%?8,128,11
2150 ENDPROC
2160 :
2170 DEF PROCerr
2180 CLOSE#0
2190 IF ERR=17 THEN ENDPROC
2200 REPORT
2210 PRINT " ";ERR;" at line ";ERL
2220 END
2230 :
2240 DEF FNgpi(len,effect,valid$)
2250 PROCcrsr(1)
2260 LOCAL a$,b
2270 a$=""
2280 PRINT STRING$(len,".");STRING$(len
,CHR$(8));:*FX21,0
2290 b=GET
2300 IF b=13 THEN PROCcrsr(0):=a$
2310 IF b=127 AND a$="" THEN 2290
2320 IF b=127 a$=LEFT$(a$,LEN(a$)-1):PR
INT CHR$b;".";CHR$(8);:GOTO 2290
2330 IF effect=0 THEN 2360
2340 IF effect=1 b=b AND 223 ELSE b=b O
R 32
2350 IF effect=3 AND(RIGHT$(a$,1)=" " O
R a$="") b=b AND 223
2360 IF LEN(a$)=len OR INSTR(valid$,CHR
$b)=0 VDU 7:GOTO 2290
2370 PRINT CHR$b;
2380 a$=a$+CHR$b
2390 GOTO 2290
2400 :
2410 DEF PROCvalid
2420 cap$=" ABCDEFGHIJKLMNOPQRSTUVWXYZ"
2430 low$=" abcdefghijklmnopqrstuvwxyz"
2440 nos$=".0123456789"
2450 pun$="-!#$%&'()=?/*:+;.,<>"+CHR$34
2460 all$=cap$+low$+nos$+pun$
2470 ENDPROC
2480 :
2490 DEF PROCr(x,y,l,w,f)
2500 MOVE x,y
2510 IF f=0 DRAW x+l,y   ELSE MOVE x+l
2520 IF f=0 DRAW x+l,y+w ELSE PLOT 85,x
,y+w-4
2530 IF f=1 MOVE x,y+w:MOVE x+l,y+w
2540 IF f=0 DRAW x,y+w   ELSE PLOT 85,x
+l,y
2550 MOVE x,y+w:IF f=0 DRAW x,y ELSE MO
VE x,y
2560 ENDPROC
```

See BBC to Arc Data Link, page 96

Listing 1. BBC to Archimedes file transfer

```
10 REM Serial transfer
20 REM by David Watkins
30 REM for BBC B/B+/M/C/E/A
40 REM (C) Acorn User February 1988
50 :
60 MODE 4
70 ON ERROR PROCerror
80 PROCtitle
90 PROCinitialise
100 PROCcontact
110 PROCchoose
120 PROCtransfer
130 *FX 2,0
140 *FX 3,0
150 PRINT "Done."
160 END
170 :
180 DEF PROCtitle
190 VDU 19,0,6;0;
200 VDU 19,1,4;0;
210 PRINT TAB(4,2);"Program Transfer v
ia RS423."
220 PRINT STRING$(40,"_")
230 ENDPROC
240 :
250 DEF PROCinitialise
260 DIM block% 127,buffer% &2000,type$
(6)
270 !block%=block%+20
280 *FX 15,0
290 *FX 7,8
300 *FX 8,8
310 *FX 2,2
320 FOR version%=0 TO 6
330 READ type$(version%)
340 NEXT
350 DATA Early Model B/Electron
360 DATA Model B, Model B+, Master 128
370 DATA Master ET, Master Compact
380 DATA Archimedes
390 X%=block%
400 Y%=X% DIV &100
410 i_am%=FNtype
420 pointer%=0
430 ENDPROC
440 :
450 DEF FNtype
460 A%=0
470 =(USR(&FFF4) AND &FF00) DIV &100
480 :
490 DEF PROCcontact
500 PROCsend(i_am%)
510 PRINT TAB(0,7);"Waiting for contac
t ..."
520 REPEAT
530 REPEAT UNTIL ADVAL(-2)<>0
540 it_is%=FNget
550 UNTIL it_is%>-1 AND it_is%<7
560 PRINT TAB(0,9);"Contact made with
";type$(it_is%)
570 PROCsend(i_am%)
580 ENDPROC
590 :
600 DEF PROCsend(char%)
610 *FX 3,7
620 VDU char%
630 *FX 3,0
640 ENDPROC
650 :
660 DEF FNget
```

Continued ▶

FILE TRANSFER

◀ **BBC to Archimedes Data Link listing 1 continued**

```
 670 *FX 2,1
 680 g%=GET
 690 *FX 2,2
 700 =g%
 710 :
 720 DEF PROCchoose
 730 PRINT TAB(0,11);"Decide which of t
he two keyboards you"
 740 PRINT TAB(0,12);"wish to work from
 (either will do)."
 750 PRINT TAB(0,14);"Press either:"
 760 PRINT TAB(14,15);"S if it is the S
ENDER or"
 770 PRINT TAB(14,16);"R if it is the R
ECEIVER."
 780 PRINT TAB(0,18);"Waiting ..."
 790 REPEAT
 800 REPEAT
 810 active%=ADVAL(-1)
 820 passive%=ADVAL(-2)
 830 UNTIL active% OR passive%
 840 IF active% THEN role%=GET:PROCsend
(role%) ELSE role%=FNget
 850 UNTIL role%=83 OR role%=82
 860 IF active% THEN state$="active" EL
SE state$="passive"
 870 PRINT TAB(0,18);"This keyboard is
";state$;"."
 880 ENDPROC
 890 :
 900 DEF PROCtransfer
 910 IF active% AND role%=83 THEN PROCf
ilename:PROCsendfile
 920 IF active% AND role%=82 THEN PROCf
ilename:PROCsendname:PROCgetfile
 930 IF passive% AND role%=83 THEN PROC
getfile
 940 IF passive% AND role%=82 THEN PROC
getname:PROCsendfile
 950 ENDPROC
 960 :
 970 DEF PROCfilename
 980 INPUT TAB(0,20);"Source filename "
,sfn$
 990 INPUT TAB(0,22);"Destination filen
ame ",dfn$
1000 IF dfn$="" THEN dfn$=sfn$
1010 ENDPROC
1020 :
1030 DEF PROCsendname
1040 *FX 3,7
1050 PRINT sfn$
1060 PRINT dfn$
1070 *FX 3,0
1080 ENDPROC
1090 :
1100 DEF PROCgetname
1110 *FX 2,1
1120 INPUT TAB(0,20)"Source filename =
"sfn$
1130 INPUT TAB(0,22)"Destination filena
me = "dfn$
1140 *FX 2,2
1150 ENDPROC
1160 :
1170 DEF PROCsendfile
1180 $(block%+20)=sfn$
1190 PROCosfile(5)
1200 $(block%+20)=dfn$
1210 FOR byte%=0 TO 127
1220 PROCsend(block%?byte%)
1230 NEXT
1240 f%=OPENIN sfn$
1250 FOR byte%=1 TO EXT# f%
1260 pointer%=pointer%+1
1270 buffer%?pointer%=BGET# f%
1280 IF pointer% MOD &2000=0 THEN PROCs
endbuffer
1290 NEXT
1300 PROCsendend
1310 CLOSE# f%
1320 ENDPROC
1330 :
1340 DEF PROCsendbuffer
1350 FOR position%=1 TO &2000
1360 PROCsend(buffer%?position%)
1370 NEXT
1380 pointer%=pointer% MOD &2000
1390 REPEAT
1400 REPEAT
1410 UNTIL ADVAL(-2)<>0
1420 reply%=FNget
1430 UNTIL reply%=42
1440 ENDPROC
1450 :
1460 DEF PROCsendend
1470 FOR position%=1 TO pointer%
1480 PROCsend(buffer%?position%)
1490 NEXT
1500 ENDPROC
1510 :
1520 DEF PROCosfile(A%)
1530 CALL &FFDD
1540 ENDPROC
1550 :
1560 DEF PROCgetfile
1570 FOR byte%=0 TO 127
1580 block%?byte%=FNget
1590 NEXT
1600 f%=OPENOUT $(block%+20)
1610 length%=!(block%+10)
1620 FOR byte%=1 TO length%
1630 pointer%=pointer%+1
1640 buffer%?pointer%=FNget
1650 IF pointer% MOD &2000=0 THEN PROCg
etbuffer
1660 NEXT
1670 PROCgetend
1680 CLOSE# f%
1690 ?block%=(block%+20) MOD &100
1700 ?(block%+1)=(block%+20) DIV &100
1710 PROCosfile(1)
1720 ENDPROC
1730 :
1740 DEF PROCgetbuffer
1750 FOR position%=1 TO &2000
1760 BPUT# f%,buffer%?position%
1770 NEXT
1780 pointer%=pointer% MOD &2000
1790 PROCsend(42)
1800 ENDPROC
1810 :
1820 DEF PROCgetend
1830 FOR position%=1 TO pointer%
1840 BPUT# f%,buffer%?position%
1850 NEXT
1860 ENDPROC
1870 :
1880 DEF PROCerror
1890 CLOSE# 0
1900 *FX 2,0
1910 *FX 3,0
1920 REPORT
1930 PRINT " at line ";ERL
1940 END
```

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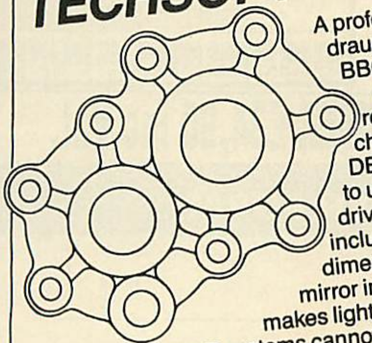
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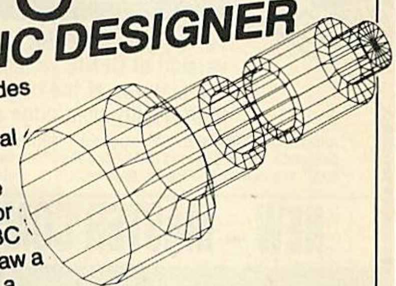


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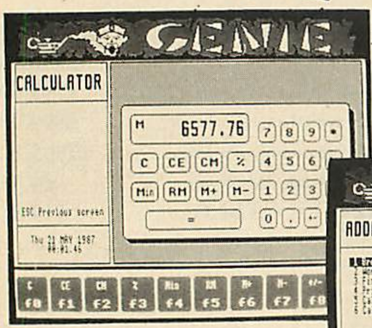
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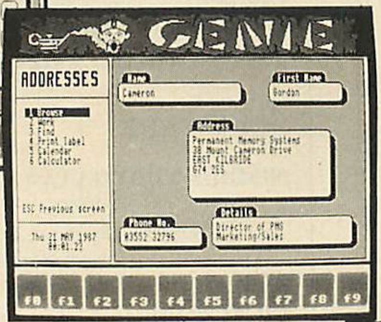
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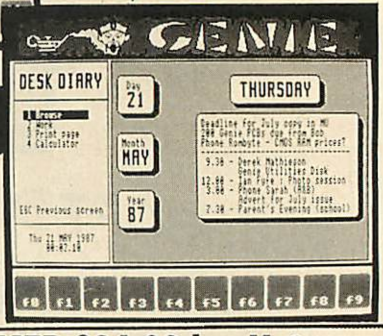
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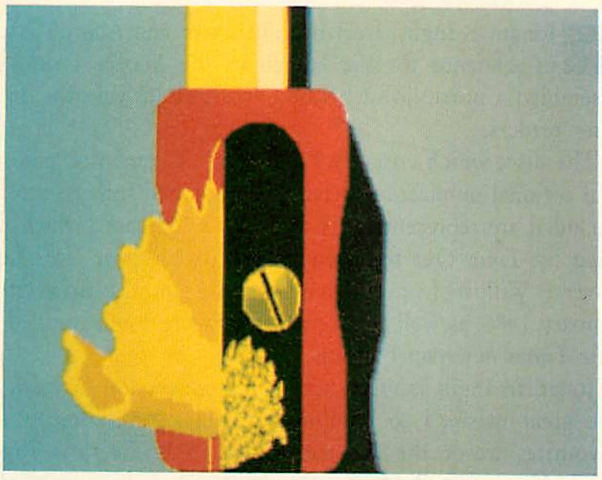
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5.25"/3.5" DFS/ADFS—ACORN/WATFORD/SOLIDISK/other ______
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OFFERS

PROGRAM LISTINGS



Beeb To Arc – simple with this month's disc

David Watkins' program and simple hardware project helps all who are up-grading from BBC to Archimedes to transfer software from the Beeb to the Arc trouble free, and you'll save money. This program is available on Arc format disc.

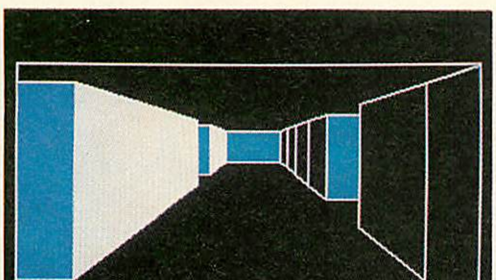
Joe's Jottings for February will prevent any further rows over who will be watching what on television. His TV timetable program will ensure you know what's on where and what you will need to video. This program is an excellent example of basic timetabling with the same principles being easily applied to school or personal time management.

Forum this month has a handy listing for Arc users baffled by the range of colours on their new machine – a program which tells you the correct codes to obtain any given screen colour.

Martin Phillips introduces you to the world of the !BOOT file, as well as sorting out your disc files with his simple disc menu routine. There is also a recursive graphics program enabling you to produce intricate graphics screens. If you have ever had problems with cassette loading errors such as 'Block Header?' or 'Data?' then we explain all.

February's listings are available in 5.25 – inch 40/80-track disc for the BBC and Master 128 and on cassette for the Electron and BBC micro users. They are also available for the first time on 3.5-inch disc for the Compact and Archimedes – see page 17.

LISTINGS



Monthly disc and cassette subscriptions

Guarantee delivery of your monthly program listings by subscribing to our discs or cassettes, for the best quality utilities, graphics and entertainment.

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Whichever you choose you won't regret the investment. All offers are open to UK subscribers only.

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Vastly reduced prices for disc binders

Our grey cloth disc binder is supplied with its own protective slip case and is filled with six transparent inserts which will hold a year's supply of 5.25-inch monthly discs, and it is currently available at the special price of just £6.95.

An *Acorn User* magazine binder is the best way to keep your precious copies in pristine condition. Our smart red binder features a wide spine with the capacity to hold a whole year's issues. For only £4.95 your magazines can last a lifetime.

Acorn User order form on page 133 – 24-hour telephone service (0672) 40825

OFFERS

PORTFOLIO DISC



A Portfolio of micro masterpieces

BBC/B/B+/M Jonathan Inglis, freelance illustrator and Acorn's artist-in-residence for the launch of the Master series, has assembled a portfolio of his best work exclusively for *Acorn User* readers.

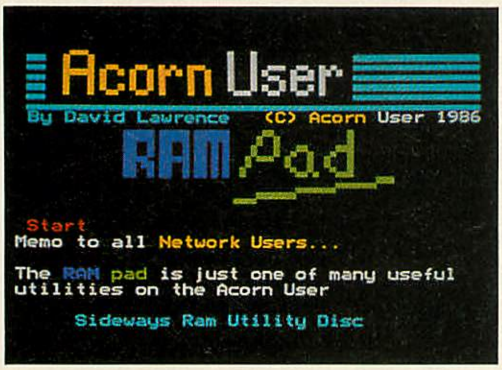
The disc, which costs £9.95, contains screens that national and regional publications have commissioned Jonathan to do. Included are representations of Seurat's 'Bathers', which was used by *Time Out* for a cover, and two *Acorn User* front covers; Willow from November 1986 and Magician from January 1986, as well as several which were commissioned by *The Times* newspaper group.

Jonathan Inglis is interested in the conversion of work by the great master's to computer graphics, and three of his favourites are on the disc for you to enjoy: Seurat's 'Riverside', Vermeer's 'Lady at the Virginal' and a copy of a lithograph by Matisse.

Pixel Editor and *Super Painter* have been incorporated to let you create your own masterpieces. *Pixel Editor* allows you draw in and alter the minute detail while *Super Painter* enables you to draw lines, texture your screen and shade by mixing the eight standard colours.

The *Portfolio* disc comes in 80-track 5.25-inch format, and makes the ideal Christmas gift for the graphics fan. Enclosed with the disc is a comprehensive instruction sheet telling you more about the pictures and how the artist created them.

DISCS



Disc for all sideways RAM users

BBC/B/B+/M/C The *Sideways RAM Utilities* disc includes: *Ram-Pad* – your computer's answer to the pad and pen. *On-Screen Fonts* – a variety of print styles available in all graphics modes. * HLP ROM – add your own help text to call up when you're stuck. Standard ROM header for use when writing your own ROMs. * RLOOK to examine the contents of your ROMs and sideways RAM images.

There are many more utilities on this 40-track 5.25-inch disc with a transfer program for 80-track users, and it's competitively priced at £9.95.

GRAPHICS



Graphics utilities for your screens

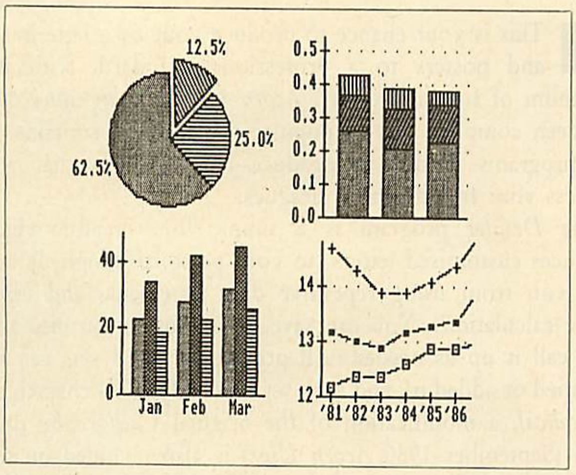
BBC/B/B+/M/C The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 routines to manipulate blocks of graphics: rotation and reflection, a screen compressor/expander, a colour flood-fill routine and three mode conversion commands.

With the Basic procedure library are multi-height, proportional and justified text and 'drop shadow' boxes. A teletext screen editor gives point plotting, line drawing, rubber banding and flood fill, along with all mode 7 control codes. All can be used in your own programs.

Acorn User order form on page 133 – 24-hour telephone service (0672) 40825

OFFERS

CHART SOFTWARE



Improve your presentation with ViewChart

BBC/B/ B+/M/ C Do you use your micro to prepare figures? Perhaps in *ViewSheet* or *ViewStore*? Do you make printed reports? This business graphics program from *Acorn User* contributor Peter Sandford is aimed at anyone who uses figures, and wishes to improve the quality of their work.

ViewChart takes your numeric data from a *ViewSheet* or *ViewStore* file, or manual input, and plots various chart formats to screen. In one plot you can produce between one and five piecharts, stacked bar charts up to 25 bars, grouped bar charts up to 24 bars and line graphs with up to five lines each of 40 plotted points.

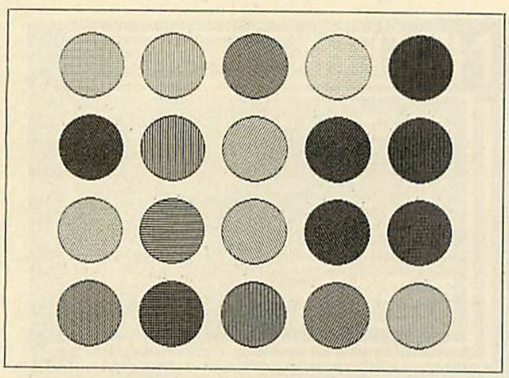
In practice, most business presentation data such as sales figures, departmental breakdowns, cost analyses and so on can be presented in a form even the boss will understand!

You can even add extra text and graphics to the completed chart prior to saving or printing. A screen dump program is provided, for Epson and compatible printers, which is specifically designed to fit the width of an A4 page. Instructions are provided on interfacing to other printers. *ViewChart* works in screen mode 0, using full shading effects, so what you see on screen is what you get on paper, and includes some tips on final presentation of graphics in documents.

ViewChart is supplied on 40-track 5.25-inch disc and works on the BBC models B and B+ and Master 128.

And the price of this professional software? Just £12.95.

ROMS



Your favourite Acorn User routines

BBC/B/ B+/M/ C/E Get *UserROM* for your favourite *Acorn User* routines. Plug in the ROM chip and 19 routines are instantly accessible via star commands, including colfill with 27 colourful fills; dotfill providing 23 new black and white shades; bad program recovery; variable lister; function key lister; a graphics compiler; a circle drawing routine and a sound compiler. There are many demonstration programs and a 22 page manual. All for £19.95.

Full details are available from Seran, Redwood Publishing Ltd., 20-26 Brunswick Place, London N1 6DJ.

ROMS



UserDump for perfect screen dumps at £19.95

BBC/B/ B+/M/ C/E The UserDump will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing in direct from the keyboard. A perfect dump can also be obtained while a machine code program is running.

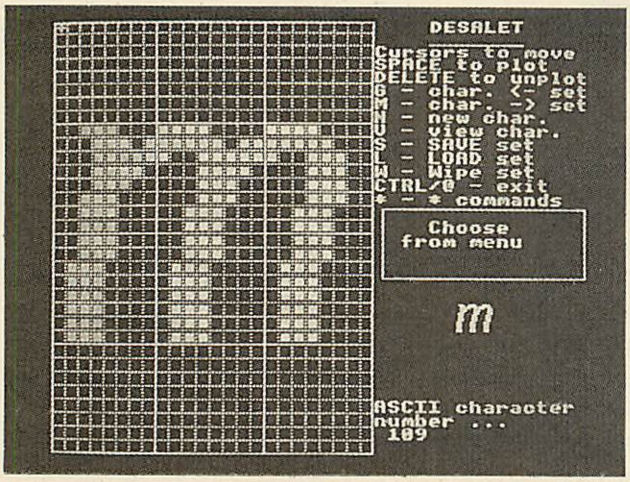
UserDump can dump a graphics window, a distortion-free dump of mode 0 screens using plotter graphics, translate teletext screen into mode 1, and shift any area of memory.

UserDump will work with any Epson-compatible printer. Write for further details to Seran (address opposite).

Acorn User order form on page 134 – 24 hour telephone service (0672) 40825

OFFERS

C A L L I G R A P H Y



A new dimension in letter designing

BBC/B/ B+/M

This is your chance to produce your own letterheads and posters to a professional standard, with the minimum of fuss and effort. *Acorn User*'s *Calligraphy* disc has been compiled due to popular demand and contains all the programs needed to produce letter designs that will impress your friends and colleagues.

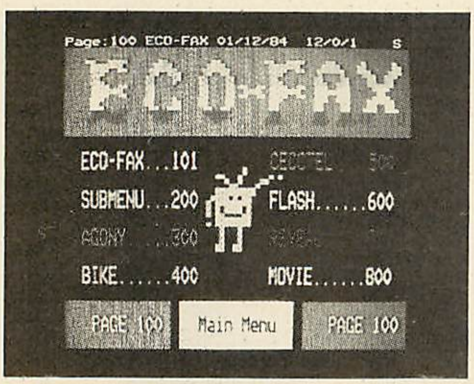
The *Desalet* program is a simple font creator which produces customised letters, to your personal design. It will save you from using repetitive data statements and error prone calculations. You can save your font set on disc and then call it up as needed. All previously saved sets can be modified or added to, and each set covers up to 94 characters.

Modical, a modification of the original *Calligraphy* program (September 1986 *Acorn User*) is also included on the disc. *Modical* allows the use of disc-based font sets created with *Desalet*. *Modical* also incorporates a modified file creation program, which permits files to be printed out immediately or saved for later printing.

An enhanced font ROM in the form of a sideways RAM image, is also on the disc. This allows you to design your own fonts for use on-screen. Any output to the printer will be in the new font – thus giving true WYSIWYG capabilities. There is a selection of new fonts to help you get started.

This superb disc comes in 5.25-inch, 40/80-track format and is great value at only £9.95.

E D U C A T I O N



Easy learning with Education disc

BBC/B/ B+/M/ C

The *Acorn User* Education disc makes learning easy and enjoyable. The disc is packed with useful programs, including the *Eco-fax* database for Econets.

Graphics are a strong feature, and included on the disc are *Turtle Logo*, *Easyplot* and *Bulletin*, and you can then show off your creations with *Vufoil* and *Noticeboard* or make music with *Tunemaker*. Also included are an all-mode dumping routine for Epson compatibles and a teletext dumping routine for mode 7 dumping to Epson FX80 compatibles. All this for only £7.95.

N E T W O R K



Network utilities for better communication

BBC/B/ B+/M/ C

The *Network Utilities* 80-track disc is the logical addition to your network, combining invaluable routines with a sophisticated yet easy-to-use noticeboard.

Included is *Netfax*, our own hybrid information system providing access to thousands of pages of information. Other special features are: a file locator and directory size finder; network manager utilities including a bridge compatible screen viewer and a 'notify all' facility.

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ACORN USER OFFERS

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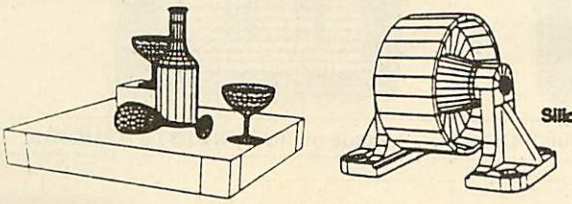
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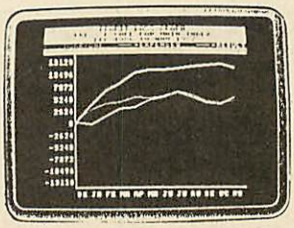
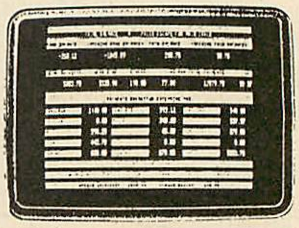
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REVIEWS

GAMES

THE GAMES PAGE

David Lawrence takes to riding motorbikes and airplanes, dabbles in geology and tries a *Repton* cheat

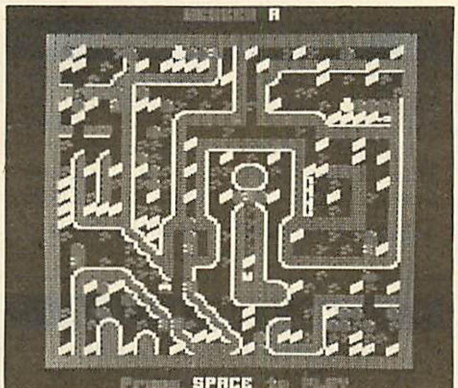
What do you get if you cross *Marble Madness* with Mat Newman? Easy – *Pouribus*! This is the working name of one of three programs that Superior Software is currently preparing for early 1988 release. Mat is best know for the chart-topping *Fortress*, the Beeb's only *Zaxxon* clone. Odd really, considering that was four or five years ago. Superior's Richard Hanson has told me Mat has sent them 'version 0.1' and although the game is too hard at the moment, Superior is very interested in it. He also says that it has the same appeal as *Thrust*: superficially simple, but actually quite complicated to play.

After the quick Christmas releases of *Spellbinder*, *Elixir* and *Bonecruncher*, Superior is planning to slow down in the first part of this year. In addition, all its new releases will be available on a variety of popular home micros; initially it's aiming at the Spectrum, Amstrad, Commodore and Atari machines.

It's all change at Audiogenic. Peter Scott is writing Atari ST software and Gary Partis has apparently left the games scene for good. Product manager Darryl Still has left to form 16-bit software company Godax, but knowing him, it's probably two eight-bit companies! Godax will also be managing a budget label company called Top Ten and its first game is called *The Warehouse*. I have also received from Darryl a compilation of three almost identical Peter Scott games. What isn't clear is whether these will be released by Top Ten or Audiogenic. The latest game definitely from Audiogenic is *Despatch Rider*, which was reviewed in *Acorn User* last month.

Talking of budget software, watch out for the 'Ricochet' label; it has been re-releasing older and often good software at £1.99. The latest I've seen is a re-issue of Ultimate's *Jetpac*.

If you like flight simulations then you may be slightly interested in the latest from


The *Repton 3* map editor

Mirrorsoft. *Spitfire 40* is not only meant to simulate a Spitfire, but is also meant to be a full aerial combat simulator. Personally, I'd stick to *Aviator*.

One company that pops up now and again is Hewson Consultants, from whom I have recently received two games. The first is the steam engine simulation *Evening Star*, based very strongly on the previous release *Southern Belle*. In fact, I'm pretty sure all they've done is change the track data – this time you go between Bournemouth and Bath rather than Victoria and Brighton. I couldn't really get into the game, but steam enthusiasts may like it.

The other release is the one *Psycastria*, *Firetrack* and *W.A.R.* were all based on – *Uridium*. *Psycastria* is the one most like *Uridium*, so if you've seen that you'll know what to expect. There are eight screens, 'metals' ranging from zinc to tungsten to fly over. You must cause as much damage as you can as well as avoid the attacking alien ships. The playing area is refreshingly large, the scrolling reasonable, and the game is pretty good overall. It's better than both *Psycastria* and *W.A.R.*, but doesn't come up to the standard of *Firetrack*, my number two game last year.

What with the recent release of *The Life of Repton*, I was most glad to receive the following program from the mysterious person ZZKJ. I was just getting used to Repton in a stetson, when suddenly he's got a walking stick and he's going blind! The program simply puts all the original graphics back – you will need the original *Repton 3* disc, the *Life of Repton* or *Around the World* disc, and a blank disc. Type in the program and save it. *COPY the screen files onto the blank disc, then run the program. Insert the original game disc and press Space, then insert the new screens disc and enter the names of the screen files you wish to convert, for example 'OAP'. The disc will whirr and the converted screens will be saved under the same name with a '1' on the end (eg, OAP1). You can then load the new screens into the game as usual. It doesn't make them any easier, but you can at least work out what is going on! I think it will help many a frustrated lizard fan.

```
   10 REM Original Repto
n 3 Graphics
   20 REM By ZZKJ
   30 REM For B/B+/M/C
   40 REM (C) Acorn User
 Feb 1988
   50 :
   60 MODE 7
   70 ON ERROR GOTO 80
   80 PRINT "Insert orig
inal disc and press SPAC
E":IF GET
   90 *LOAD PRELUDE 2000
  100 ON ERROR IF ERR=17
 END
  110 REPEAT
  120 INPUT "File to con
vert "a$
  130 X%=OPENIN(a$)
  140 FOR A%=0 TO &E1F
  141 A%?&2000=BGET# X%
  150 NEXT
  151 CLOSE# X%
  160 $&900="SAVE "+LEFT
$(A$,6)+"1 5800+2620 0 3
1E0"
  170 X%=0:Y%=9:CALL &FF
F7
  180 UNTIL FALSE
```

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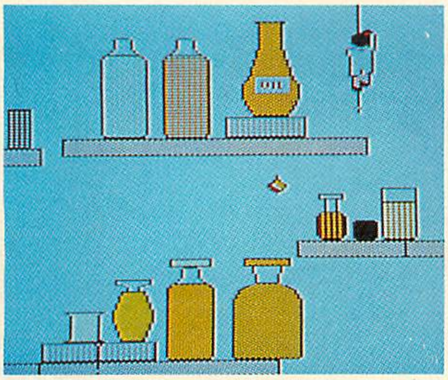
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COLD TURKEY



Elixir; Superior Software; BBC, Electron, Master, Compact; £9.95 (tape), £11.95 (5.25-inch disc), £14.95 (3.5-inch)

The scenario for Superior Software's latest BBC/Electron game, *Elixir*, might be mistaken for part of the current campaign against the dangers of drug abuse. Chemist Cyril, experimenting playfully in his premises one night, mistakenly overdoses on a powerful reducing agent. Now only inches tall, his only hope is to reach his emergency supply of magic elixir.

As if getting to the elixir were not enough, you in your role as Cyril need to maintain a sharp awareness of the effects of the pills you pop all over the game. Some colours slow you down. Others speed you up. Green pills cause you to fall over whereas the yellow ones lead to a sudden death. It's probably better to stick to the reds. These are socially acceptable vitamin rations, which reward you with 50 points for each one you . . . er . . pick up! You have to get all 40 of them.

Other elements in the game include phials of powerful acid – best avoided – and mysterious magic beans. Sadly, even these colourful accessories cannot disguise the fact that *Elixir* is another variation on the weary platforms-and-ladders theme, and a pretty second-rate one at that. The screen display is a window scrolling around a large virtual playing area consisting of shelves and tables.

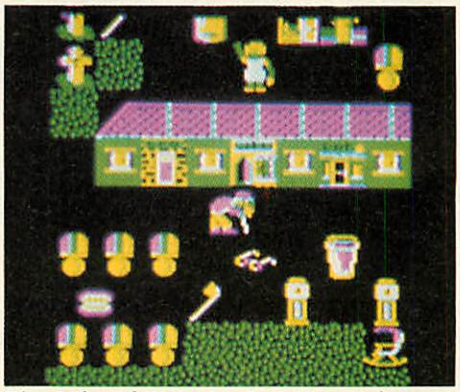
As you work your way up the levels you find handy items of equipment which protect you against such unlikely assailants as lipstick missiles, flying flash-bulbs and a monster called the 'Circularsaurus'. Some of the things you find help you along your way, much as in text adventures. A thread, for example, can be dangled over a hook to provide a new way up or down between shelves. The logical puzzles are well thought out and can give patient players something to get their teeth into.

Sadly, though, the presentation of the game lets it down. The graphics are large and clear, but they flicker annoyingly. Movement is jerky, and the best thing about the insistently grating sound is that it can be switched off.

The platform-and-ladder game is an old and creaky format which deserves to be given a rest.

Irving Jacquette

A DAY IN THE LIFE



The Life Of Repton; Superior Software; BBC, Master, Compact, Electron; £6.95 (cassette), £7.95 (5.25-inch disc), £9.95 (3.5-inch disc).

Repton, the character who has appeared in more sequels than Sylvester Stallone, is back for the fifth time!

In The *Life Of Repton,* you have to guide baby Repton from short trousers, through his rebellious teens and into the Post Office for his pension.

Game-play is identical to the original *Repton 3* and *Around the World in Forty Screens*, with different graphics and new levels to complete. Each set of eight screens makes up a stage in Repton's life, of which there are five. These are Repton as a baby, at school, as a teenager, at work, and lastly, Repton as an OAP!

The new characters are well thought out and, more importantly, amusing. As well as provoked dogs, there are aggressive mods, vindicitive bosses, and annoyed wives. When Repton is at school, instead of fungus, there is homework. At work, it is replaced by filing trays!

The new screens are trickier than ever. As you would expect, the ultimate level is particularly sneaky. Upon starting you find yourself surrounded by false teeth – the equivalent of spirits in *Repton 3.* As with all *Repton* screens it is possible, just! I shall not tell you the password but it isn't too difficult to work out.

If you liked *Repton 3* then you will love *The Life Of Repton.* It's a great game, but Superior beware – you can't squeeze much more life out of poor old Repton.

Richard Bellis

MAKING AN IMPACT

Impact; Audiogenic; BBC B, B+, Master, Electron; £9.95 (cassette), £12.95 (disc, not for Electron)

Impact is based on an Atari game of the same name, which is based on *Arkanoid,* which is based on *Breakout*!

The game-play is very similar to *Arkanoid*; you must destroy the bricks in standard *Breakout* fashion, kill the aliens (or avoid them) and collect the falling tokens.

There are four types of brick; standard, multi-hit, indestructable and invisible. The latter can be made visible by use of an icon. The aliens wobble down the screen getting in the way and deflecting your ball.

Instead of collecting a laser gun, you must collect enough of the U-shaped tokens to 'buy' the laser. There are nine icons you can attain in total, ranging from 'slow down', through 'wide bat' to 'power ball'. When a screen is completed, you are told its access code, this then enables you to start again at that screen.

The sprites move speedily and are fairly smooth, if rather on the small size, and I thought that some of the ball bounces were rather jerky.

Impact's best feature is its size – with 80 screens, a screen editor, an intelligent demo mode and numerous cheat options.

Impact is a good game. I prefer the 'feel' of *Arkanoid* but like the extra features provided by Impact. In the end you pays your money and takes your choice. Me? I like 'em both!

David Lawrence

SOFTWARE

ARTISAN AT WORK

The dictionary defines 'artisan' as 'a skilled workman'. A fitting name for the first Arc art program, finds Dave Futcher

Any BBC micro owner interested in graphics will have seen a whole host of software come and go over the last five years. Although *Artisan* has appeared very early in the life of the Archimedes, it is a sophisticated graphics package which, in the right hands, can help produce some outstanding drawings. Its programmers have a very good pedigree. They are Jon Warmisham and Frank Dart who programmed both *Fleet Street Editor* and *Art Room* for Clares.

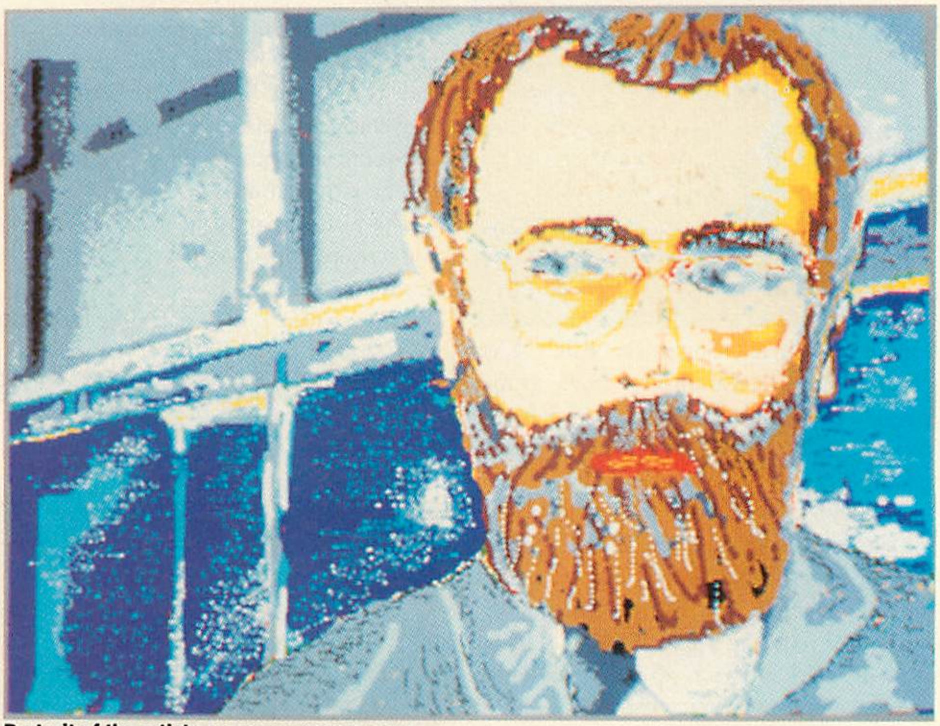
Too many computer art packages fail to give the artist enough space to work. *Artisan* doesn't fall into that trap. The whole screen area is available for drawing. As the package uses mode 12 you have an area of 640 x 256 pixels.

Usually there is no pull-down menu or tool box taking valuable screen space, as with *AMX Super Art*. Neither is there anything that resembles the two large pop-up menus of *Quest Paint*. Instead *Artisan* uses the wonderful window management facilities that the Archimedes offers and gives the user a whole series of real pop-up menus for different functions.

Artisan is a true 'load and go' program. Despite the amazing power of the Archimedes, there is no lengthy installation or nasty configuration process.

The *Artisan* boot file reads the machine's configuration set in CMOS RAM and saves it to disc. It then switches off the modules that it does not require to recover work space and sets the values of the CMOS RAM to those needed by the program. At the end of your *Artisan* session all the previous settings are restored by another program file.

Artisan is mouse controlled. It's used for everything except for the text input option and entering filenames. The convention of Select, Menu, and Adjust for the left, centre and right buttons has been followed with the package. Select is used in two ways: first, to select a function by clicking on an icon; and second, for carrying out an operation such as drawing or plotting a point. When the Menu button is pressed the current menu is always brought up on the screen, and Adjust is used to undo the last function.



Portrait of the artist as a young programmer

Once *Artisan* is loaded you will see a white screen with a beige border. Displayed in grey and blue is *Artisan*'s main menu window. If it's not there you merely click the mouse menu button.

Although *Artisan* has a lot of different icons they are not too difficult to remember. Some very good associations, like the rainbow for the magic brush, and some rather strange ones, like the yellow cat for sprites, ensure you quickly remember what does what.

In *Artisan* there are a lot of menus to work with, it's very easy to move around. You won't get lost in a maze of menus because on each sub-menu the top right-hand icon tells you where you are. Getting back home to the main menu is easy too, as the top left-hand icon is always a back arrow which returns you there.

If you don't like where the menus pop up, they can be changed by clicking the *Artisan* title bar and dragging them to where you want them to appear in future.

Artisan features a very useful on-screen help display. Once the exclamation mark icon has been clicked on from the main menu a help window opens at the bottom of the screen. The help window is updated as you move around the different icons and shows the effect of the mouse buttons. As it only takes up a small amount of the screen it is an ideal way to aquaint yourself with the program when you first start. It disappears when drawing operations begin.

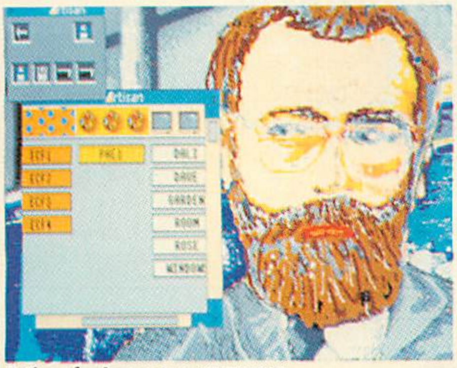
The main drawing part of *Artisan* is what Clares calls the rubber banding menu. It's called this because all the drawing facilities rely on the now traditional rubber banding technique that makes computer drawing so easy.

Rubber banding is based on the idea that you fix the first point and select the second by moving the mouse around. As you move the mouse, the software continually shows the line or outline shape that would be drawn if you selected that point.

This menu gives you access to most of the effects that make the bare bones of any

graphics package. There are facilities for drawing circles, rectangles, triangles, ellipses and parallelograms. Of course it covers the drawing of lines, linked lines and segments. I found that I used the continuous line feature a lot for putting the simple details in pictures after the first on-screen preliminary sketch.

The top right-hand icon, which tells you what menu you're using, also controls whether the shapes are drawn in outline or filled in. Its a simple toggle command. The



***Artisan* features pop-up menus**

palette icon allows the setting of the colour or pattern to be used.

Artisan has a full set of painting facilities. Some old friends have been considerably improved, while others are in new guises. In addition, there are a couple of excitingly different facilities that break new ground. For example, there is a unique control system for enlarging and decreasing the brush size. I found it excellent for putting in line detail where previously I would have had to use a pixel editor.

Artisan also provides four brush shapes – circle, square, triangle and oval.

Nearly every computer painting package has a spray can and/or an air brush. *Artisan* has neither – a terrible omission you would think. However, once you access the user pen and the pen designer icons, the omissions are more than compensated for. The pen designer allows you to create special effects for drawing and painting.

Probably the most powerful feature of *Artisan* is its zoom editor. If you click this icon a window opens up that shows a portion of the screen doubled in size. The window always shows the portion of the screen that you were last editing before selecting the zoom. If you press the Adjust button, the zoom factor increases to four and then eight times normal.

Pressing the Select button plots a pixel at the pointer position. A press of the mouse Menu button brings up a palette from which you can change the current colour.

Pixel editing is an effective means of putting in detail. With *Artisan*'s zoom editor things are taken so much further that the finest details can be added.

The feature that is a real first for *Artisan* is its 'magic brush'. Its effects have to be seen to be believed. It really does seem to revolutionise colour shading, as any of the 16 colours can be redefined two or three times as another colour and when the 'magic brush' brushes a coloured area the original colour changes to the redefined one. I am still exploring what it can do!

The move and copy menu gives access to whole host of features for manipulating areas of the screen. You can reflect, copy, shrink, expand and rotate.

It's possible to flip an image top to bottom or left to right with ease. The block copy facility lets you copy an area the same size as the original, while scale and copy allows you to enlarge and to reduce a part of the screen that you have boxed. The rotate facility works pretty much in the same way as the copy feature, but as the box is placed on the drawing screen you can rotate it by moving the mouse in a circular motion. Exclude is a very useful option that lets you set a mask by making any one colour transparent when copying, scaling or rotating.

Using the toolbox option, you can alter the sensitivity of the mouse, change the palette and use a full screen and partial printer dump. *Artisan* has a grey scale printer dump built in. Strangely you cannot access the two Integrex colour dumps from here. Instead you have to leave the program, enter Basic, chain in the dump and then place your disc with screen files in the drive ready for loading. The Integrex printer dumps provided with *Artisan* drive the colour jet printer in the undocumented 36-colour mode.

You can add text in any of the 10 supplied fonts. The system can cope with 26, and these will be sold as an add-on package. Anyone familar with *Fontwise Plus* from Clares will recognise the origins of the *Artisan*. The 10 supplied fonts are a good selection.

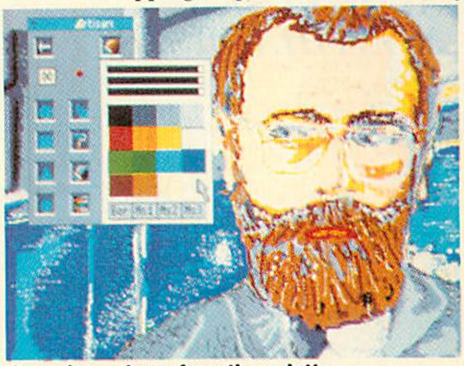
One unusual feature, which is a special effect rather than a utility, is the distort function. This will place a box around a specified screen area which can then be twisted in the horizontal plane.

Well-hidden (and rightly so) is the option which lets you clear the screen to the current colour or pattern. Thankfully the mouse's Adjust button will undo the clear and restore the previous screen.

Artisan provides a separate menu for controlling all the access to the disc. It's a colourful affair too, with icons to distinguish the different types of *Artisan* files present on the disc. Loading screens is simplicity itself – click on one of the file names. Loading and saving seems to have received a lot of thought from the programmers. It's friendly and foolproof but slow as the standard Archimedes operating system routines have been used.

Clares could have easily provided something five time faster but it may have been at the cost of compatibility and ease of movement of the screen from package to package. Sticking to standard routines certainly makes the loading of digitised pictures created with the Watford Electronics Archimedes Digitiser very easy. When an Archimedes desktop publishing package arrives it will make the loading of *Artisan* picture files considerably simpler too.

As you would expect *Artisan* operates at a lightning fast speed. Shapes and lines are created on screen instantly; fills really flood on; flipping shapes and block moving



Choosing colours from the palette

is very quick indeed. Amazingly though, some 93 percent of *Artisan's* program code is written in Basic (57k Basic and 4k machine code).

Unfortunately I feel that the manual rather lets the package down. The 38 pages do covers all the essentials. But it would really have benefited from the guided tour approach. I feel that the manual fails to expand on the real possibilities that the package offers, although to be fair *Artisan* can be run with reasonable success without consulting the printed word!

It would be easy to say that *Artisan* is one of the best freehand drawing package, I have ever used. You certainly can't compare it in any way with the eight-bit BBC art software. It's streets ahead. Clares has produced a great first in art programs for the Archimedes, but the exploitation of the power and potential of the Arc's hardware has hardly begun.

Artisan is compatible with the Archimedes only. It costs £39.95 from Clares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire CW9 7DA.

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FAX AT YOUR FINGERTIPS

The *Fax File Organiser* is a nifty package which can customise pages for your Filofax, as Dave Futcher discovers

The Filofax is one of the most compact and adaptable ways of storing personal and business information. The loose-leaf design of the Filofax makes conventional diaries, planners and address books redundant.

The new tools, or in some people's eyes toys, are a status symbol of the Eighties but not only yuppies have the Filofax to help organise their lives. Ordinary people like me and you use them too!

Filofaxes have the great advantage of being portable, but suffer from the disadvantage of being difficult to maintain. Those pencilled-in additions to the diary made over lunch, or the new addresses and phone numbers that are hastily and often illegibly scribbled, spoil the organisation. A mature Filofax system needs regular maintenance to keep things in a presentable, alphabetical order. This can be quite a daunting procedure.

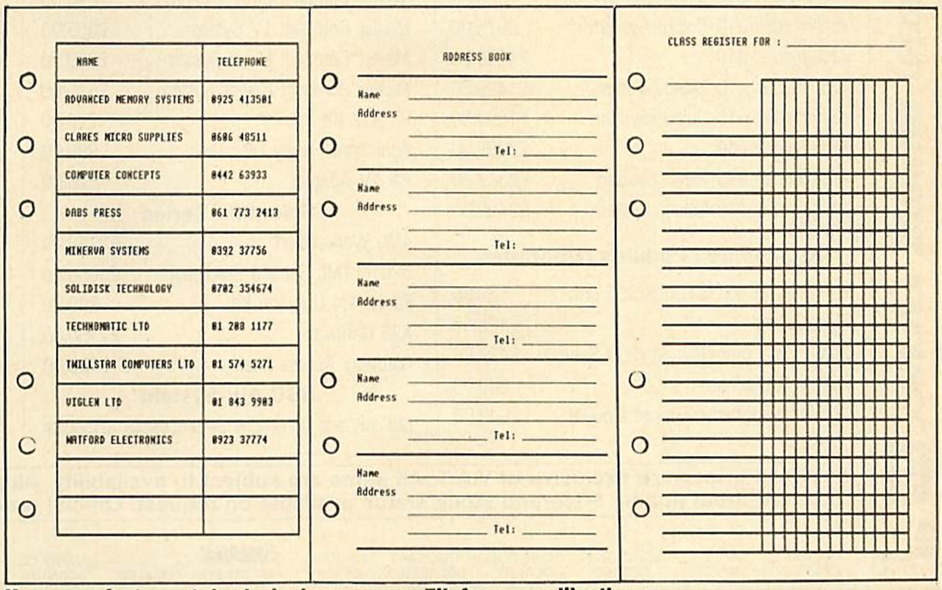
It is a shame when the style of a fine Italian leather binder is somewhat spoilt by the scribbled notes and altered entries. Wouldn't it be marvellous if your diary, address lists and personal memoranda could have a professional typeset appearance? Well now they can.

You can use your BBC micro and a package called the *Fax File Organiser* to keep your Filofax in pristine condition. This software from Mewsoft combines the organising potential of a micro with the portability of a pocket book. Because the information you need to store is constantly changing, *Fax File Organiser* sets out to make hard copy updates of personal information an easy task.

The Fax File Organiser consists of a suite of three programs, all driven from an icon-controlled menu.

There is a calendar printer that enables you to print out your own personalised diary for a specified month of a complete year. This uses a data file that you have created on disc.

The printed diary can either be one week or one month per page. You can get the BBC micro to print out diary pages with specific events such as meetings marked, or include important events and dates such as birthdays or anniversaries.



Keep your facts neat, by designing your own Filofax pages like these

The second part of *Fax File* is the address book printer, which allows you to create and sort a file of names, addresses and telephone numbers. Unfortunately, due to the BBC micro's limited memory the address book can only have eight pages with six entries to a page. But that's not a problem as you can split your address book up into a number of alphabetical sections. Either the entire address book or just a couple of pages can be printed as replacement inserts for your ring binder.

The final part, and probably the most remarkable aspect of the *Fax File Organiser,* is its forms designer. This allows you to design specific pages of forms for particular purposes, such as timetables, balance sheets, petty cash accounts, memos, tick off charts, price or parts lists, expense forms, work records or the directions to your office. You work out a design with an excellent on-screen designer, enter the data and keep a copy in your binder.

You don't have to hand feed bits of real Filofax paper into your printer or cut up normal sized paper to fit. Mewsoft supplies suitably sized continous feed paper, with the holes in the right place. Unfortunately the paper does not come at all cheaply: one hundred sheets will cost you £5 and 500 sheets are £20. Both prices include postage and packing.

Fax File has been designed to work with Epson-compatible printers, however, if your printer does not support double-density graphics or reverse line feeds, don't worry – the package includes a 'patch' to get *Fax File* working.

Mewsoft is soon to release an add on for *Fax File*. The extension disc will cost £9.95 and includes a label printer that uses information from the address book and a simple database that will bring computer control to Filofax lists.

Fax File is one of those interesting products that has found its own little niche. It is a simple but effective product that is very easy to use.

While you could do a great deal of what *Fax File* does with some general purpose software like a wordprocessor and database, you would have to define all the stuctures and print layouts. I suggest you don't bother, and buy *Fax File* instead.

The Fax File Organiser *costs £12.95, and the extension disc costs £9.95. Both are available from Mewsoft at 11 Cressy Road, London NW3 2NB.*

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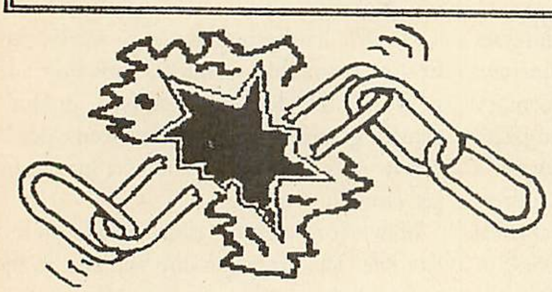
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BOOKS

ON THE TRAIL OF THE HACKER

Hugo Cornwall hit the headlines with his controversial guide to hacking. Steve Mansfield finds that in his latest book he has changed sides

Every time a computer is installed in an office, a new opportunity for crime opens up. Micros are replacing sawn-off shotguns and modems are taking the place of getaway cars when it comes to ripping off the big companies.

At least, that's the impression you get from nervous whispers in the industry and reports in the press. And there is little doubt that computer-based crime is on the increase, with estimates of the damage varying from a million pounds a month to a million a day.

What's wrong with this popular image of the silicon blagger is the way the thief actually goes about the crime, and exactly what is being stolen.

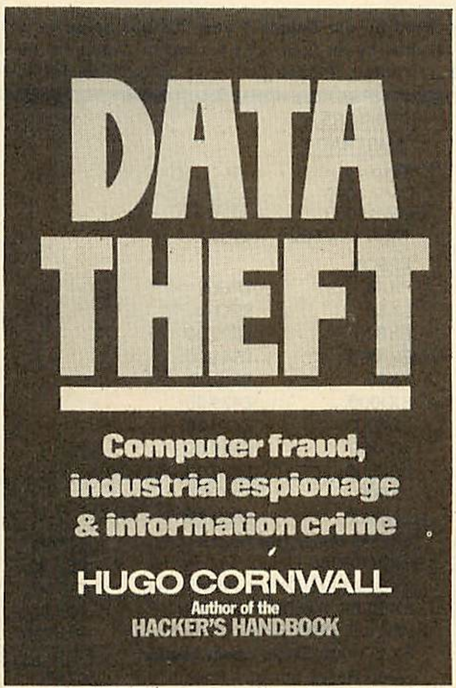
This is the subject Hugo Cornwall tackles in his latest book. It's a far cry from the naïve excitement of this pseudonymous writer's earlier work, *The Hacker's Handbook*. That was the computer trade equivalent of a potboiler, rushed out in time to derive the maximum benefit from the public's fascination with the newly-discovered concept of crime-by-modem.

In the more heavyweight *Datatheft*, Cornwall takes a serious, sober and generally less gee-whizz look at the security problems posed by micros. He has, after all, his reputation and his career to consider now.

The shift from notoriety to reputation is an interesting one. Once Special Branch had got over its desire to interview Cornwall, and interest in fiascos like the Great Prince Philip Mailbox Hack had subsided, companies started to look to their own security.

Most were too ignorant of the risks and possibilities to assess the situation by themselves, and so needed an expert. Who better than, you guessed it, Hugo Cornwall himself.

Working under the real name of Peter Sommers, Cornwall has made a reasonable living out of telling people how their security can be broken or avoided. What he learned in the process was rather interesting – that most crimes involving computers have nothing to do with the exotic areas of computing. Very few security breaches involve the black art of divining passwords by modem. Few require the tapping of data lines or the bribing of computer staff. Quite a lot just involve making a simple back-up of a floppy disc that has been left carelessly lying around the office.



Data Theft **is Hugo Cornwall's guide to keeping your company's data secure**

The nature of the theft is also different to the popular conception. It's true that the more glamorous crimes do take place, involving hacking into systems, the use of complex electronic equipment, movements of large amounts of money arranged by tapping keys with the right secret codes, and so on.

Most of the crime, however, is considerably less exciting. Fiddling figures on the company's accounts computer is one common example. Getting hold of a rival's sales figures is even more widespread. After all, in the business world, up to date information is often as good as cash.

The fact that an increasing number of crimes are committed through the use of a computer is not an indication that micros are intrinsically useful tools for the thief. It has to be seen against the massive spread of the ubiquitous micro.

There are, however, dangerous aspects to this blanket acceptance of micros. Cornwall points out how the sophistication and power of the micro, compared with mainframes and minicomputers of even just a few years ago, has taken computing tasks away from specialists and put them on the desks of managers and secretaries. These are people who may be trained in using the software but who might not be fully aware of the vulnerability of the information they are manipulating.

Walking into an office and backing up some of the discs lying around, or copying files from a hard disc drive, is easier and often more effective than trying to gain access through a modem port. Yet companies which have spent large amounts of time and money on installing sophisticated anti-hacking devices on to their telephone lines don't even bother to lock away floppies at night.

Cornwall goes through the major risks and how to avoid them. The book is packed with information, and so is a useful reference work. Anyone responsible for looking after the integrity of computer systems will also find it a must – they might even be able to dispense with Cornwall's services as a consultant!

The author identifies not just the most likely forms of theft, but also the people most likely to carry it out – which perhaps surprisingly turn out to be disgruntled middle management.

However, unless you have a vested interest in the subject matter, I think you're going to find *Datatheft* a very dull read. There's little to titillate, unlike *The Hacker's Handbook*, and Cornwall's writing style is very dull and business-like.

If you have reason to worry about being the victim of computer crime, buy this book. Otherwise, spend the money on getting *Wargames* out of the video library, and enjoy the fantasy.

Datatheft *by Hugo Cornwall is published by Heinemann Professional Publishing at a price of £14.95.*

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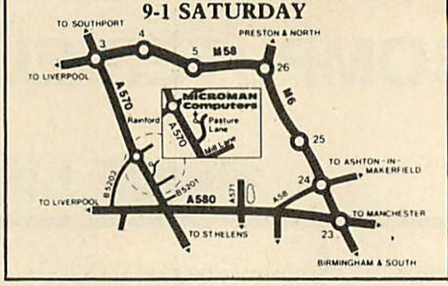
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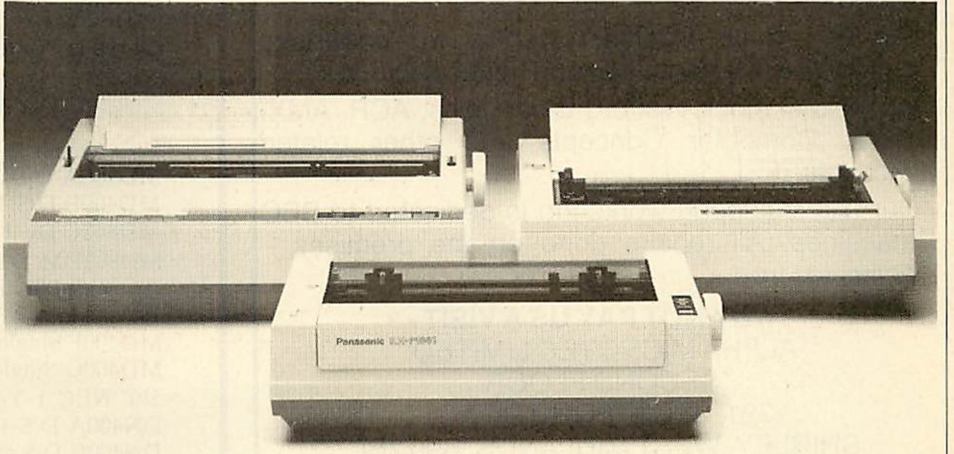
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HARDWARE

ON THE LINE

Three Panasonic printers – two dot-matrix and one daisy-wheel – are taken to task by Bruce Smith

Over the past couple of years many of the traditional Japanese electronic firms – mainly famous for their hi-fis – have burst onto the printer scene in a concerted effort to grasp some of the market from Epson domination. Panasonic is one of the most recent and has introduced a good range of general-purpose printers. Under scrutiny here are three of the most popular – two dot-matrix and one daisy-wheel.



The printers on test; (l to r) KX-P3131, KX-P1081, KX-P1083

Panasonic KX-P1081

The first thing that strikes you about the KX-P1081 is its size. It occupies just under 16 inches by 11 inches and at 4.5 inches high will remain unobtrusive and take up little desk space. It's still slightly bigger than my trusty Citizen C120D, but feels more robust and meatier.

The tractor-feed mechanism is completely contained within those dimensions – a neat piece of engineering – so there is nothing to stick up and get in the way. Feeding the paper is very easy indeed, it feeds in flat from the rear and exits in the same direction.

Located in the top of the panel are three recesses containing the main switches – tractor/friction feed selector, on-line/form feed and line feed buttons, and lastly a mode selector button which allows near letter quality (NLQ) and condensed print to be selected as standard. The power on-off switch is located on the right-hand side of the printer.

The printer ribbon is unique for a dot-matrix printer, though somewhat similar to those found on daisy-wheel printers. It is a cartridge system which snaps into place over the print-head. This makes it very easy (and clean) to change ribbons. However, it is not particularly standard and replacements, at £4.50, are more expensive than usual. Access to the printer ribbon is very good and simply requires the removal of a snap-off cover.

The printer itself is of nine-pin dot-matrix type which is, as far as I can see, fully Epson and IBM compatible. Five basic printing pitches are available – standard Pica (10 characters per inch), Elite (12 characters), compressed (17), semi-compressed (15) and proportional spacing.

The standard printing speed of the KX-P1081 is quoted at 120 characters per second though in practice it did seem to be somewhat slower. The printer is not particularly quiet but nevertheless the noise level is acceptable, and it has a rather miserly 1k print buffer.

As mentioned, the full set of standard Epson and IBM control codes are supported plus some extras which are worth a little further investigation.

The italic character set can be made to print international characters in standard print mode, when ASCII codes 128 to 159 and 255 are sent to the printer. Also character 136 is a pound sign. This should help to make the age-old printer question: 'How do I print pounds and hashes?' easier to deal with.

A print selection mode is available. Most printers allow you to combine various effects, for example double width, emphasised Elite, but to do this would normally require three sets of control codes to be sent to the printer – one set for each. By using the selection mode, the whole lot can be produced using a single three number code – the last number defining the effects to be switched on. There are 64 different combinations which can be used. The double width emphasised Elite selection would require 27, 33 and 63 sent to the printer which from Basic would be:

```
VDU 2,1,27,1,33,1,63,3
```

This is particularly useful with word-processors such as *View*, where the printer driver is rather restrictive. A single highlight code can be made to do all three functions, thereby avoiding the need for multi-highlight codes.

The NLQ offered by the KX-P1081 is well-formed and may be printed in Pica, Elite or italics. A selection of word-processing commands are also available and these allow text to be printed left- or right-aligned, centred or justified.

Standard, double and quad density graphics are available plus 640-dot, 576-dot and 720-dot density modes. The 576-dot density mode is particularly interesting as it provides a 1:1 printing ratio, which should enable the printer to be used to print proportional screen dumps, for example. All the old favourite *Acorn User* printer dump routines including *UserDump* worked with no problems. Downloadable characters are also catered for.

The manual is well-presented and reasonably easy to follow, though the description of some of the printer effects tend to be rather short and terse.

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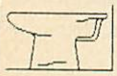
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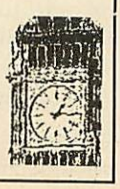
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HARDWARE

KX-P1083

Sleek is an adequate word to describe the design of the KX-P1083. Like the KX-P1081 this is a nine-pin dot-matrix printer. It is a bit larger than the KX-P1081 and certainly weighs more.

There are no slider switches; instead touch buttons occupy one side of the top front facia of the printer. Through these NLQ, Pica, Elite, compressed and proportional print modes can be selected. An interesting feature is a small dial switch which can be turned to set the form length of paper from three-inches to 12-inches.

In operation the KX-P1083 is fast – 240 characters per second in draft mode. It has a more acceptable 6k print buffer, which can be expanded to 38k – ideal for printing long documents. The buffer can be divided in a variety of ways so that sections of it can be used for downloadable characters and to hold text for printing.

In terms of special effects, the KX-P1083 has all that the KX-P1081 has to offer, plus a few more. Interestingly, super and subscript can be printed in NLQ! There are 80 selectable effect combinations in print selection mode.



ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890!#$%&'()-=~^|<>?

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890!#$%&'()-=~^|<>?

KX-P1081: 'competes very strongly'



ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890!£$%&'()-=^~<>?*

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890!£$%&'()-=^~<>?*

KX-P1083: 'fast and robust'



ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890-^\,,./;:!£$%&()

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890-^\,,./;:!£$%&()

KX-P3131: 'a very good buy'

KX-P3131

The KX-P3131 is a 110-column daisy-wheel printer. Naturally, it is larger and heavier than the KX-P1081, but at 19-inches wide by 13-inches deep, it is still desk-sized.

A Courier 10 daisy-wheel is supplied with the printer and this is compatible with the Diablo 630 series daisy-wheel, which is a sort of unofficial standard in the daisy-wheel world. The printer can use most daisy-wheels as long as they are Diablo 630-compatible. Changing daisy-wheels is very easy – access is through a tilting top panel. The printer ribbon is in cartridge form and this snaps into place over the print-head.

Slightly unusual for a daisy-wheel printer is the bi-directional printing capability – like a dot-matrix printer, it can print from left to right and then right to left. This allows for slightly faster printing. At 17 cps the KX-P3131 is not particularly fast, but the print quality is very acceptable.

Paper is fed in from the top and can be up to 13.5-inches wide down to four-inches wide. Horizontal tabbing can be in increments as fine as 1/120th-inch. The printer should therefore handle the widest range of forms, invoices and so on.

Despite being a daisy-wheel, there are still a number of useful control codes implemented. Most of these concern the setting of margins and moving the paper to and fro. Special effects available include, bold, shadow, outline, underlining, double underlining, strike out and centring.

Surprisingly enough, the printer has a graphics mode which is rather limited, but effective graphs can be built up. Non-standard print-wheels can be used with characters accessed through their spoke position on the wheel.

All three printers come with Centronics parallel interfaces fitted as standard. If you have the correct printer lead (not always included in the price), you can simply plug in, turn on and begin printing. A serial interface is also available for those who require it. Overheat, paper out and cover open detectors are also fitted as standard.

All three printers have much to offer, in particular the KX-P1081, which at under £200 competes very strongly with the Citizen C120D as the best budget printer. It is certainly much more robust. However, it is still slightly more expensive and does not have the two-year warranty of the C120D.

The KX-P1083 is fast (especially in the normally slow NLQ mode), and robust but slightly disappointing in overall facilities. Nevertheless, the print quality is excellent and the wide range of control codes, particularly in print selection mode, make it easy to use within any application.

The KX-P3131 is a sturdy daisy-wheel printer and its ability to accept a wide range of print-wheels makes it a very good buy.

Typical retail prices inc VAT: KX-P1081, £178; KX-P1083, £305; KX-P3131, £282; Sheet feeder, £224; Tractor-feed, £104.

HARDWARE

DYNAMITE WITH A LASER BEAM

Laser printers represent a quantum leap in print quality. David Atherton investigates one of the more affordable models

Laser printers offer better output quality and speed than the more common dot-matrix variety, and the new Epson GQ3500 is typical of the new breed of laser machines coming on the market. Depending on where you buy, it is one of the cheapest laser printers around, and being from Epson is sure to be widely supported. The machine uses a Ricoh laser mechanism, the 'engine', and offers the usual 300 dots per inch resolution.

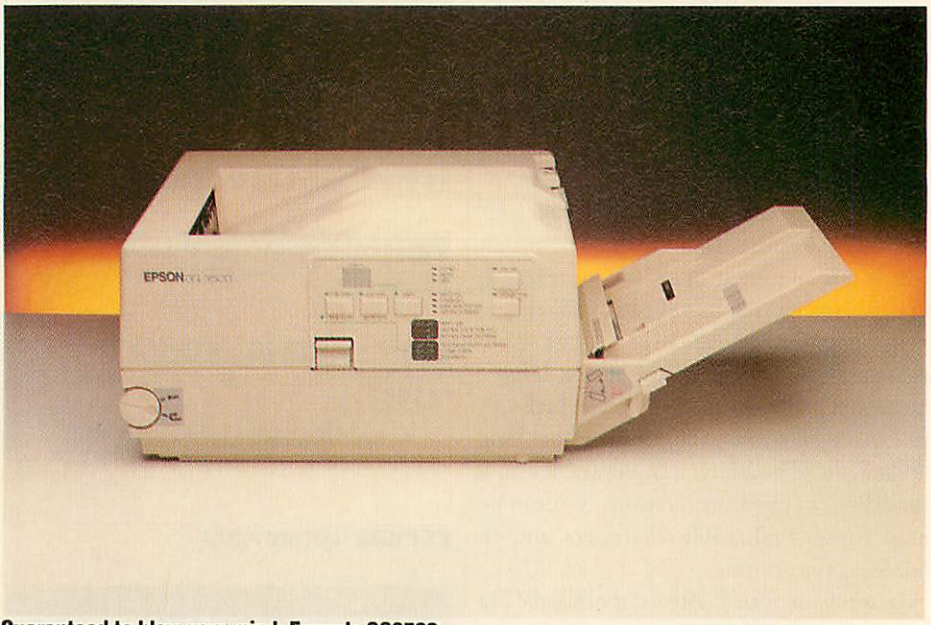
The GQ3500 is, like most laser printers, contained in a box about the size of a small photocopier with a paper feed tray on one side and a collection tray on the other. Unlike some models, the feed tray doesn't need removing to load paper, and the whole machine, while taking up a little more space than a matrix printer, is no bigger than an average computer system. A high capacity paper tray is available as an optional extra.

The box is plastic, just like a matrix printer, and doesn't feel very robust. However, during the course of this review it survived being bounced around the back of a van for a 400-mile trip to London and back, so appearances are deceptive.

The machine is connected to your BBC micro using the same cable as any other parallel printer. As on earlier printers, Epson offers a serial option, which again takes a standard serial printer cable. Before the printer can used, the toner cartridge needs to be fitted. This is carefully packed to avoid spillage, and clear instructions show you how to put it in the printer.

After printing one of the two test pages, by holding control buttons while powering up, you are ready to go. Unlike other printers, lasers have a warm-up time, which in this case is about 15 seconds.

By default, the machine starts in a typeface called Courier 10, which is actually the font used by most daisy-wheel printers. In this font the character pitch is mono spaced, ie, not proportional, and all the normal effects such as bold, underline and italics are easily obtained using the normal range of Epson control codes. Many people may go no further, just using the printer in this mode as though it were a fast, quiet, auto-load daisywheel.



Guaranteed to blow your mind: Epson's GQ3500

Text printing is done in exactly the same way as normal printers except that pages are not printed until complete. They are merely held in memory until the page is full, or a form feed (ASCII 12) character is received, and then paper passes through and the whole page is printed in one go. If the last page of a document doesn't fill the sheet, it will be necessary to send a form feed character. There is a button to do this on the side of the printer if your software won't do it. *View* does this automatically, and *Wordwise* and *InterWord* will do it as long as you have a footer (even a blank one) or finish the document with an eject page command.

There are, of course, many new features on the GQ3500 which don't apply to dot-matrix printers, and these too are controlled by Escape codes. There are two other fonts built into the printer: EDP, a small mono spaced type, particularly good for tables and listings; and Modern, a neat proportional font. IBM graphics symbols similar to those above character 128 on a Master make up a fourth font.

Additional fonts such as Epson's versions of Times and Helvetica are available as plug-in cards (see the box). All these are selected by new Escape sequences, and although each font is supplied in a particular size, they can be printed at other sizes. The printer supplies the enlargement or reduction, again controlled by Escape sequences. So as long as you can define your own Escape sequences, which all popular wordprocessors allow, you can use any font in any size.

It is also possible to download fonts designed elsewhere into the printer. The printer can simultaneously hold about eight fonts of 224 characters each. These are defined using a fairly complicated yet comprehensive system, which cries out for a piece of definition software. It has no practical limit on font size, and copes with proportional fonts by allowing a different width for each character definition. The definitions are bit mapped, rather than vectored, which means that a different font needs to be defined for each point size. It's quite likely that in due course you'll be able to buy new fonts for the printer on disc for downloading.

In normal text printing on the GQ3500, it is perfectly straightforward to change disc-based fonts and apply attributes such as emboldening at any point in the text.

However, it is not possible to generate any different text sizes.

Instead you are restricted to the sizes available. This problem is overcome if you have many sizes of a font, which is the case with the extension font cartridges.

A point to make about fonts is that because rotation is not catered for inherently by the GQ3500 operating system, a separate set of fonts is required for 'portrait' (paper is taller than it is wide) and 'landscape' (wider than tall) use.

In common with most laser machines, the GQ3500 is also an exceptionally high resolution graphics printer and 300 dots per inch allows fairly lifelike pictures. However, Epson has made a quite amazing omission. The standard setting for the machine does not support the normal FX80 Escape "K" and Escape "L" sequences. This means that you can't just do a dump from *PrintMaster* and similar programs. Not to worry though, Datathorn Systems (see page 151) has produced a BBC dump for the GQ3500. For those who wish to write their own graphics software, the bit images are easy to control. In fact they are very similar to the FX system, but the control codes are different.

The GQ3500 will emulate the Epson LQ range, and in this mode it will do double-density graphics, using the Escape "L" sequence. This is useful, but not ideal.

As well as Escape codes, graphics can also be obtained by using four other commands: ALLOCATE (allocates graphics area), CIRCLE (draws a circle or arc), LINE and PAINT.

Epson has introduced a unique control system with the GQ3500. Called Selectype, it enables the user to select parameters such as paper size or line spacing with just the buttons on the case. Over 160 different options can be chosen manually – useful if your software refuses to co-operate.

The GQ3500 works with standard A4 paper, although it will take A5 and B5 and the imperial sizes too. Photocopy paper is perfectly good, and costs about £5 per 500 sheets. The toner cartridge must be replaced every 1500 copies, and these cost about £30 each.

Interestingly, the top of the toner cartridge is removable and it looks as though it may be possible to refill it, but I'm sure that's not recommended practice. This adds up to a raw running cost of about 3p per sheet, although that doesn't take into account the cost of replacing other parts, or the cost of the printer itself.

Several manuals accompany the GQ3500 and, as I reported in my LQ800 review recently, Epson has really got its act together on manual production. 'Setting Up and Getting Started', 'Solving Problems' and 'Maintenance' contain exactly what you'd expect, and are written to the level of a non-technical office user. 'Basic Everyday Use' is mainly a manual on using the Selectype feature, whereas the 'GQ3500 Reference Guide' covers all the control codes, DIP switch options and so on. I also received a separate manual covering the Hewlett Packard LaserJet Plus emulation card. This is fairly thin and assumes you are using an IBM PC.

The manuals are well written, and illustrated where necessary. They are more or less in the right order, and good indexes help you to find any topic quickly. A nice touch is that the Reference Guide contains a master index covering all topics in all the manuals. I must however repeat what I said in the LQ800 review – there's really one manual too many, and 'Basic Everyday use' ought to merge into 'Reference Guide' or one of the simpler ones.

The standard manuals explain all the Escape codes, and how to select fonts and so on. A full programming manual is available as an extra. This 285-page book documents the Escape codes in more detail and also explains how to use the graphics primitives. Also in this manual are all the details on font design and downloading.

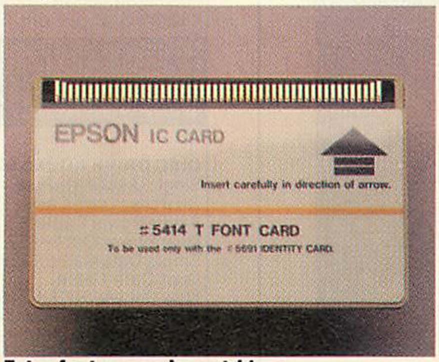
Is the GQ3500 worth buying? To answer that I'll have to assume that you have decided that you do need a laser page printer – perhaps for quality, perhaps for speed and quietness. The price is fine; you aren't going to find anything much cheaper than this at the moment – although like any emergent technology prices are bound to fall sometime. All the machines around offer 300 dots per inch, and the quality of the GQ3500 is as good as any other.

The built-in typefaces aren't exactly comprehensive, but they rarely are on low-cost lasers. However, they're good enough for office use, and desktop publishers can always get the additional font cartridges. Particularly good points are the programming manual and the fact that firms like Datathorn are committed to the BBC market. This is important because, as a BBC user, you'll find that the world of PC laser printer support just can't help you. The only minus points are the paper tray, (overcome if you buy the flat loader) and the lack of FX80 graphics.

Epson, 388 High Road, Wembley, Middlesex HA9 6UH. Tel: 01-902 8892.

FONT CARTRIDGES

To extend the range of fonts printable by your GQ3500, separate font cartridges are available from Epson. These like a credit card in size and shape, containing a ROM covered in plastic, with a small neat gold plated edge connector. The cartridge plugs into the slots at the side of the printer, which must then be rebooted.



Extra fonts come in cartridges



Font cartridges simply plug in

The printer then recognises the additional fonts, which can be selected with Selectype or by control codes.

Each font card can contain up to 16 fonts. This doesn't necessarily mean a number of typefaces, as each typesize of a typeface is a separate font. Also the landscape version of each typeface and size involves a separate font. Bold and italic faces are also separate fonts. The card contains identification characters for the font. For example 5 PRESTIGE 10N 0B, which means Prestige, font number 5, at 10 characters per inch. The GB means italic (oblique) and the N means a portrait font (L is landscape).

A slight drawback to the font card system is like that with sideways ROMs. Only two font cards can be present at once as there are only two slots. This limits the number of typefaces in a document although it has to be said that one of the ugliest aspects of desktop publishing is the proliferation of fonts within the same document.

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Graphics output is astounding

FORM GENERATOR

The first software produced specifically for the Epson GQ3500 is surprisingly not an IBM PC package, but a forms design program for the BBC micro. Datathorn Systems, a company run by Vince Hagedorn, has produced *FORMS1*, a form design package which utilises the line-drawing and form storage capability of the GQ3500.

The package contains an 80-column text editor to design the form, and translation and downloading routines to store the form in the printer's memory. You are in fact limited to about 77 columns because of the print border.

These are then held in the printer's memory. Any text can then be printed as normal from a wordprocessor, but by embedding the sequence Escape "}",1,n where n is the number of the defined form (maximum eight for the 630k machine), a predefined form will appear superimposed upon the output. *Wordwise Plus* and *InterWord* allow embedded Escape sequences, but *View* would need a special printer driver.

The software is not particularly sophisticated – you are limited, for example, to the Courier typeface – but it does utilise a powerful feature of the printer. Datathorn supplies the GQ3500 and the software is free. The program costs £11 on it own. Datathorn sells the printer at a discount price of £1723 including VAT and delivery. At the time of review, Datathorn is offering an HP Laserjet Plus card and printer cable free.

Contact Datathorn Systems, George House, 50 Spring Grove, Loughton, Essex IG10 4QD. Tel: 01-508 4904.

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Tricolore Test, Unit:	score %	C'est extra	Remarks
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2.			
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Attainment tests	listen	read	speak	write	score%	Remarks
1A						
1B						
2A						

Redbridge Certificates:	Blue	Pink	Gold	Remarks
Date awarded:				

Signed:__________

On behalf of Woodbridge High School (Department of Modern Languages)

Datathorn's form generator uses the line drawing facilities of the printer to the full

EMULATION MODES

The GQ3500 can operate in several modes. When powered up it is in 'native mode', which means that it accepts the standard codes documented in the manual. These are a superset (all and then some) of the FX80 codes, less but FX80 graphics and some meaningless commands such as skip over perforation. By setting DIP switches, the printer will emulate an Epson LQ2500 – the top-of-the-range 24-pin matrix printer.

Emulations of two other printers, the Hewlett Packard LaserJet Plus, the best-selling laser printer in the world, and the Xerox Diablo daisy-wheel, are provided by optional plug-in cards. These are provided for the IBM world, where much software already drives these two printers. Master 512 and Arc PC emulator users take note!

For BBC users, the full documentation of native mode programming, compared to the unfamiliar and difficult syntax of the Hewlett Packard control codes, will mean that many people will stick with the basic 'native mode' machine.

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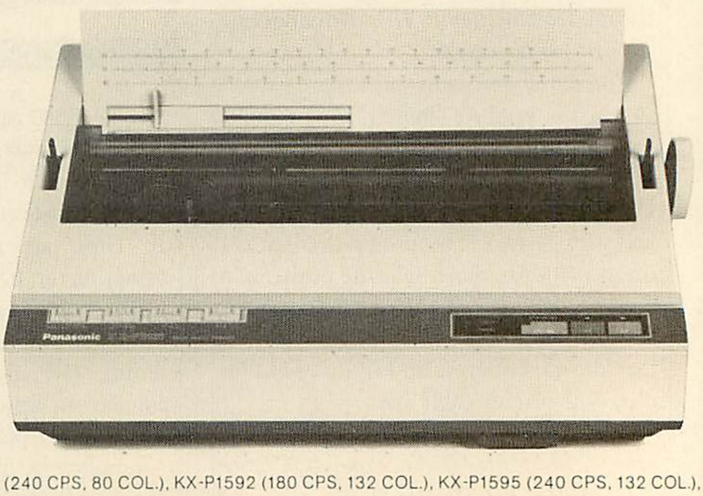
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The KX-P1081 Dot Matrix model, for example, zips through your documents at 120 characters per second, or you can switch it to print excellent near letter quality results.

Alternatively, if you want to go all out for quality, the Panasonic KX-P3131 Daisy wheel prints at a busy 17 characters per second.

The results were impressive



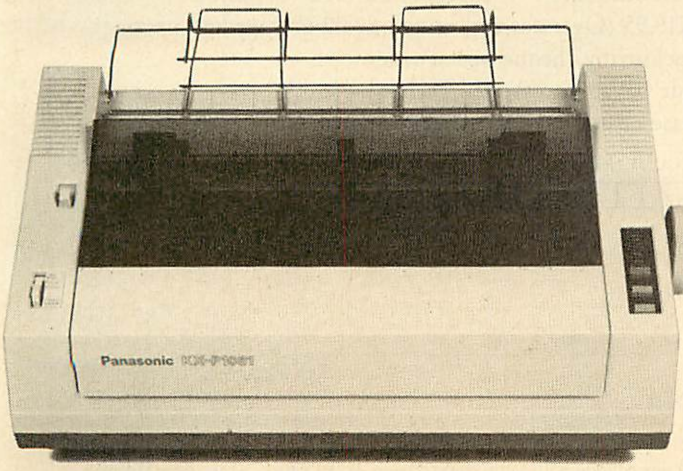
MATRIX PRINTERS: KX-P1081 (120CPS, 80 COL.), KX-P1082 (160 CPS, 80 COL.), KX-P1083 (240 CPS, 80 COL.), KX-P1592 (180 CPS, 132 COL.), KX-P1595 (240 CPS, 132 COL.),

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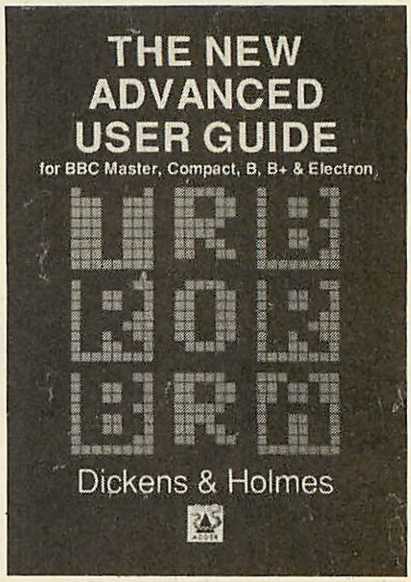
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Net setting software

Sherston Software has announced an Econet version of *Typesetter*. This has been designed to run with level 2 and 3 file servers, and costs £60.

Upgraded versions of *Typesetter*'s user discs are now available. If your disc has a title 'TPset-V0.5' then you already have the new version. To find the title, type *CAT and look at the top left hand corner of the catalogue. Extra features in the new version include disabling the Break key in the typesetter section, parallel and serial printer options, printing without a page border and a protected blank page.

If you don't have the latest version, then return your original user disc or a blank formatted 40- or 80-track disc (please state which) and Sherston will update it free.

Mightier Pendown

Extra utilities have been included in Logotron's *Pendown* wordprocessor, which you can buy on disc for only £9.

Eight new fonts on the disc include larger, lower-case 'infant' letters, and two sets of graphics characters. There are also sample adventure games generated using the *Pendown Adventure Writer*. These include *Money*, a pocket money shopping adventure.

Pendown now operates on a variety of machines, and an MS-DOS version is in preparation to be released soon.

Special needs work in closure threat

Efforts are being made to save the four special education microelectronics resource centres (SEMERCs) due to close next March when their funding runs out. The centres, presently funded by the Microelectronics Education Support Unit (MESU), provide help in microelectronics for children with special educational needs.

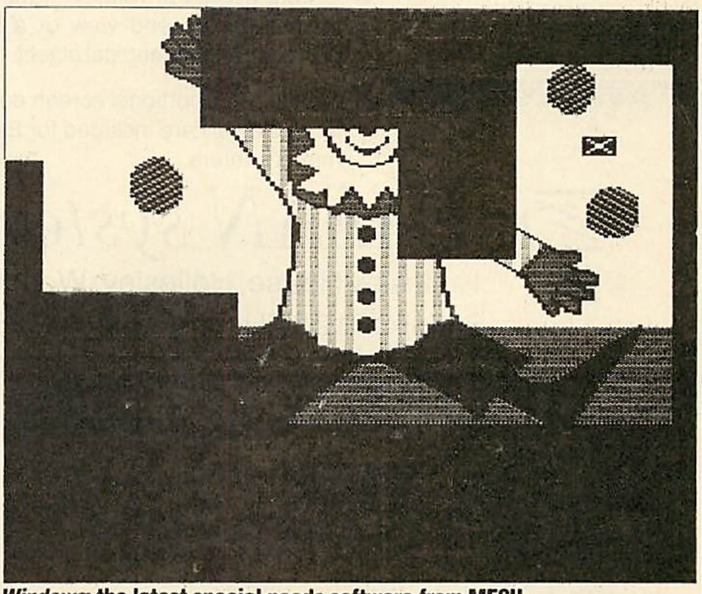
Manchester SEMERC – the others are in Newcastle, Bristol and London – is hoping to relocate to Oldham, which already supports the northern ACE centre, said manager Martin Littler. 'Oldham will be our host and underwrite many costs, but we are hoping that most of the LEAs we already serve will support us.

'The more that do this the cheaper it will be. MESU may still be able to provide some money, perhaps a quarter.'

MESU's special needs work has been well received and there is concern that this will end with the SEMERCs. Newly appointed special needs coordinator Peter Fowler said 'We hope regional consortia will replace the SEMERCs, and draw on MESU help to provide a more effective service.'

When consulted, LEAs were keen to see special needs support continued. Centres like SEMERCs were thought to be the best way to do this.

MESU has recently published two packs of materials developed jointly by the SEMERCs and members of the Primary Projects.



***Windows*: the latest special needs software from MESU**

Prompt/Writer contains two wordprocessors for use with the Concept Keyboard. They are new versions of previously published software, redesigned to simplify communication with the computer for pupils with special needs.

Each wordprocessor copes with different needs in the classroom. *Prompt* guides the child a good deal more, helping the child to transmit ideas from brain to paper. *Writer* is a second level wordprocessor with more facilities.

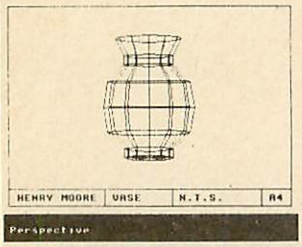
Printed output from both packages may be in any one of four different sizes of text. There is also a utility disc provided, to create overlays for the Concept Keyboard.

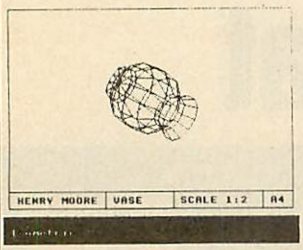
Window, is a 'framework' program. It enables you to reveal slowly on screen different parts of a picture or text by means of a window which may be moved around the screen. The child sees only part of the whole screen. Working with other children a child can develop inferential skills and build up an overall idea of the picture on screen.

Single copies of the software are available from regional SEMERCs. LEAs wanting multiple copies should contact MESU. *Prompt/Writer* costs £3 per copy for up to four copies, and £2.50 for larger quantities. *Window* costs £4.50 for up to five copies and then £4.

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NEWS

Programmers ignore advice on Arc

Acorn's new guidelines for Archimedes programmers will make the machine difficult to use, claim leading software houses. They fear potential for using extra power to simplify computing will be wasted.

Guidelines for software developers state software should not alter the configuration of the machine – it should be left to the user 'to set up the appropriate environment for the application'.

This can be very complicated: the *Artisan* art package needs two pages of instructions for preparing the Arc. Commenting on this, Resource's director, Peter Avis, said: 'Computer configuration instructions are unlikely to endear the machine or the software to teachers or children.'

To avoid these complexities, companies including Resource and Clares have ignored Acorn's advice – their software automatically sets up the machine. With *Artisan*, the original configuration is restored on leaving the package.



Resource says Acorn's advice is too complex for schoolchildren

Contacts

Bristol SEMERC, Bristol Polytechnic, Redland Hill, Bristol. Tel: (0272) 733141.
Deltronics, Heol-y-parc, Cefneithin, Llanelli SA14 7DL. Tel: (0269) 843728.
Econet User Group, Balkeerie Cottage, Eassie by Forfar, Angus DD8 1SR.
Logotron, Gwydir Street, Cambridge. Tel: (0223) 323656.
Manchester SEMERC, Manchester Polytechnic, Hathersage Road, Manchester M13 0JA. Tel: 061-225 9054.
MESU, Science Park, University of Warwick, Coventry CV4 7AL. Tel: (0203) 416994.
Mirrorsoft, 66-73 Shoe Lane, London EC4. Tel: 01-377 4644.
Newcastle IT Unit, Pendower Hall, West Road, Newcastle Upon Tyne NE15 6PP. Tel: 091-274 3820.
Newcastle SEMERC, Newcastle Polytechnic, Coach Lane Campus, Newcastle Upon Tyne. Tel: 091-266 5057.
Redbridge SEMERC, Dane Centre, Melbourne Road, Ilford, Essex. Tel: 01-478 6363.
Sherston Software, 8 Court Street, Sherston, Wilts. Tel: (0666) 840433.

Education show at Barbican

January's British Education and Training Technology '88 show at the Barbican in London will feature a series of seminars organised by the MESU.

The four half-day sessions will cover the role of information technology in humanities, music and electronics teaching, and the benefits of micros to children with special needs. The speakers will include Phil Ellis, whose Touching Sound project at Warwick University aims to integrate cheap sound sampling into the music curriculum to broaden pupils' experience.

The BETT show is the new name of the former Hi-Tech show, changed to recognise the role of technology in training. It runs from January 20 to 23 with the seminars on the 21st and 22nd.

Admission to the show is free to educationalists, but tickets for the seminars are £14 per session. Both are available from Sue Harrison at EMAP International Exhibitions Ltd, 12 Bedford Row, London WC1R 4DU. Tel: 01-404 4844.

School report writing makes progress

Newcastle Information Technology Unit have developed *Progress*, a simple to use but powerful profiling unit. It is suitable for use by teachers at a variety of levels in education.

The software allows teachers to write reports describing student's achievements by selecting appropriate comments from a menu of statements. These statements may be edited at any time. The authors recommend that the software is used as an integral classroom resource, so that profiling takes place during interviews with students.

The package interfaces with a number of wordprocessors and with Acornsoft's *ViewStore* database. Full user support is available from the IT Centre and a site licence is available at a cost of £30.00.

Education news in brief

■ *Fleet Street Editor*, the Mirrorsoft newspaper package is now available for the Master Compact at £44.95.

■ Deltronics has launched a printer port switch unit allowing any three Acorn micros to share one printer. The switch is electronic, not mechanical, so is less likely to fail. It draws its power from the user port of one of the micros, and comes complete with cables and instructions for £67.85.

■ The National Econet Users Group continues to expand. Originally set up as a forum for people with an interest in or problems with Econet, the group now publishes a newsletter containing information accumulated from the membership's experience.

UK's subscription to the group is £8.60 including newsletter. European members must add a further £2.00 and those outside Europe, an extra £3.50 to cover the additional costs.

Membership is strictly limited to those people with a professional interest in Econet.

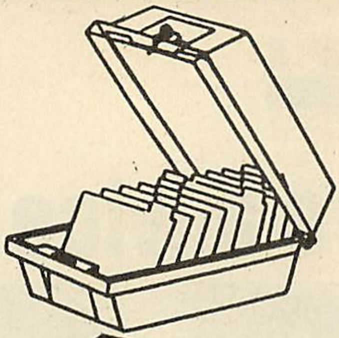
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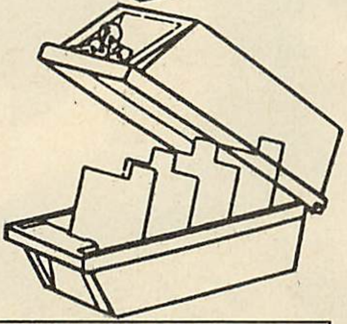
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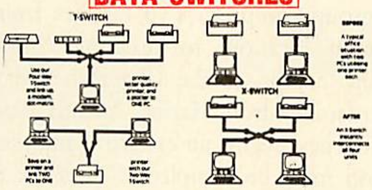
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HOW THE WEST WAS WON

Historical simulation packages are a real boon in the classroom when well thought out and presented

Chris Drage and Nick Evans

'Dear Beatrix, I have reached California and I wish you were here to see how beautiful it is. The weather is getting warmer but I hope it doesn't get too hot. It took us ages getting to California and I expect you'll be coming here as well. Ma and Pa are getting the houses built, but I am sure it will take a long time.
Love from Jesse'

So writes Farah, a 12-year-old from a west London middle school. During eight weeks in 1987, Farah's class of 25 mixed-ability children embarked on a hazardous crossing of the North American continent. They were simulating the passage of real emigrant pioneers through a resource package called *Wagons West*, from Tressell Publications. This work was part of the humanities curriculum on migration. In the October 1987 issue of *Acorn User* we discussed in detail how adventure software, in the hands of a skilled teacher committed to resource-based learning, can lead children into worlds beyond their direct experience. The same can be said for simulation software such as *Wagons West*.

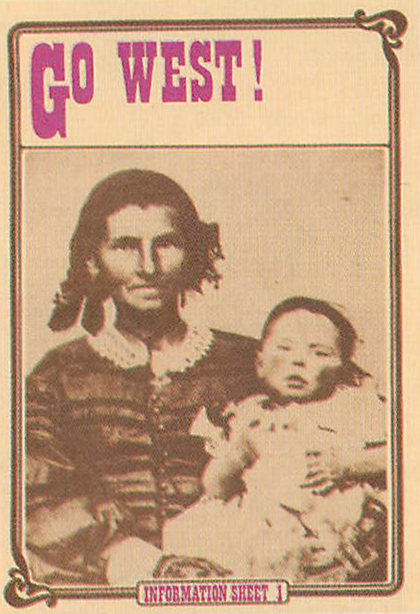
Wagons West is based on groups of children adopting a mid-19th century pioneer family and helping them traverse the North American continent to arrive safely in California.

The preparations

The class had access to only one computer for only one morning a week, so the work had to be carefully organised to maximise the use of the limited time available.

Resources were gathered; the pack suggests a bibliography of 11 children's and 14 teacher's titles. In addition, filmstrips, slides and posters were obtained. Extra copies of books were taken from the library and photocopies of a number of the maps and work sheets from the pack were made. *Wagons West* itself provides a number of support materials which give relevant historical, geographical, and sociological information, along with contemporary written accounts and illustrations.

As an introduction, the children embarked on some general map work about North America from class atlases. This gave them some familiarity with the lie of the land and the major geographical obstacles they were to meet in their progress west: the Rockies, the Platte River and so on. The teacher was very concerned that the children, having been fed on a diet of popular Hollywood westerns, might embark on the study with the wrong attitudes and expectations. She showed them a series of slides depicting the real 'wild west', and this led to a more informed discussion about the hardships of the pioneers and the hazards they faced. An interesting side issue about the role of the indigenous American Indians also arose.



Photographs of settlers accompany the pack

The children chose their own work groups of three or four, based on friendships. This was done deliberately, as the program expects the children to take on the role of one particular family. It was hoped that this arrangement would help children experience some measure of group empathy. However, Tressell suggests that each group should have at least one very competent reader and this was achieved by subtly guiding the grouping.

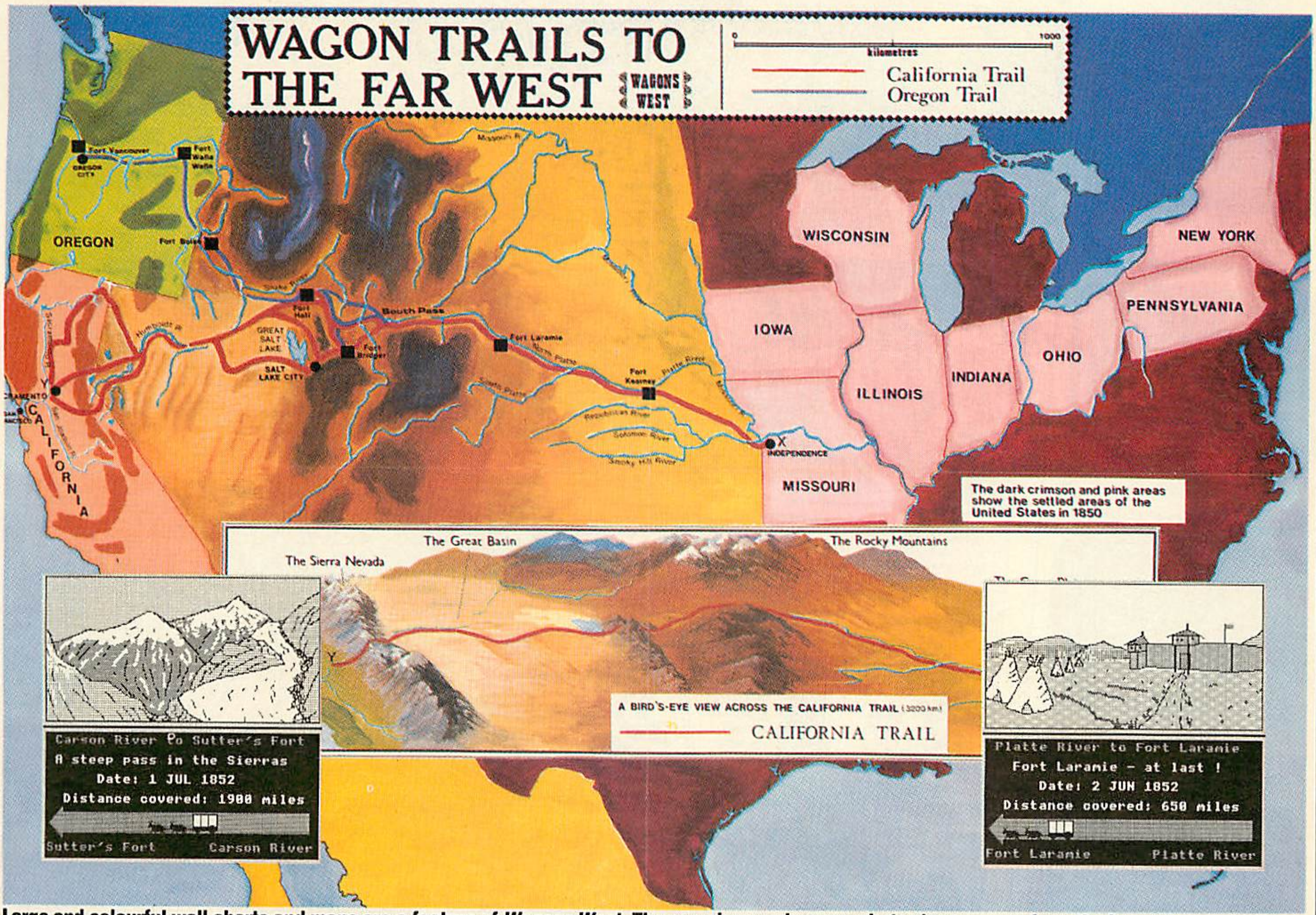
The simulation began with the children choosing which group they would represent – a group comprises two families from a common location, for example 'Marion Group' comprises the Chapman and the Salter families from Marion, Indiana. Before the journey begins an extensive fitting out section must be completed. To assist this vital part of the simulation, the pack provides group cards, fitting out record sheets, information sheets, a poster and a computer program. This range of materials proved vital in the once-a-week computer session, engaging all the children while groups worked in rotation at the single computer. It took two whole morning sessions to complete this part of the simulation. The children were very amused by the bartering which had to be done over the sale of bullocks, and each group ended up paying a diffferent price. The program guides the children into making sensible choices about supplies to purchase, and inadequate preparations are avoided.

The journey

For this part of the simulation the pack provides trail maps, journey record sheets, nine information sheets and a poster. The quality of these supporting materials is excellent. Information sheets provide background material but require a high reading age. This is why each group should have an above average reader. They proved suitable for 12 year olds.

During the simulated journey, the children met many of the people and problems that the real pioneers encountered. At each stage the children were given a number of choices and how successful they were depended on the decisions that they took. There was an impressive amount of discussion that ensued and some maturity of thought went behind each decision with the 12-year-old group. The process of gathering information and recording events was made as interesting as possible – the children kept diaries, made sketches of people they met, made taped interviews with Indians and 'mountain men', and generally recorded their work in a variety of different ways.

The historical authenticity of Tressell's packages brings children close to the experi-



Large and colourful wall charts and maps are a feature of *Wagons West*. The superimposed screen shots show scenes from the journey

ences of the emigrants, as is evident from the diary entry below for stage two of the journey by the Marion Group.

■ **12th June 1852** So now we start our journey. The trail follows the Platte River.

■ **14th June 1852** One of the children in our group fell into the Platte River and got sucked in by the mud and drowned.

■ **16th June 1852** We saw a small group of Indians approaching our wagon train. We had a choice of what to do: fire guns to scare them away, offer them cattle or horses in return for a safe journey, or invite them for a meal. We decided to trade for a safe passage. The Indians kept their promise, and let us travel safely through.

■ **20th June 1852** One of our group's wagons overturned in the South Platte and was wrecked. Several wagons in the train had wheels or tyres broken off.

■ **25th June 1852** We came across a woman all alone. She said her husband had died of cholera two days earlier. We had to leave her behind because we didn't have room. But we gave her food. We were lucky because we learnt later that she died of cholera too.

■ **27th June 1852** Not far from Fort Laramie now.

■ **29th June 1852** We reached Sioux Indian country so we had to take care and watch over the animals at night. We lost two oxen.

■ **2nd July 1852** Several wagons in the train had broken wheels or tyres off. We had to stop for a day to make repairs.

■ **4th July 1852** At last! We have reached Fort Laramie. Thank God for that.

As each group reached California, individual children also had to write letters home to relatives describing their feelings on arrival, as Farah wrote to Beatrix at the beginning of the article.

This class of 12-year-olds concluded their work by presenting their experiences to the assembled school, where they relived the trials and tribulations of their migration.

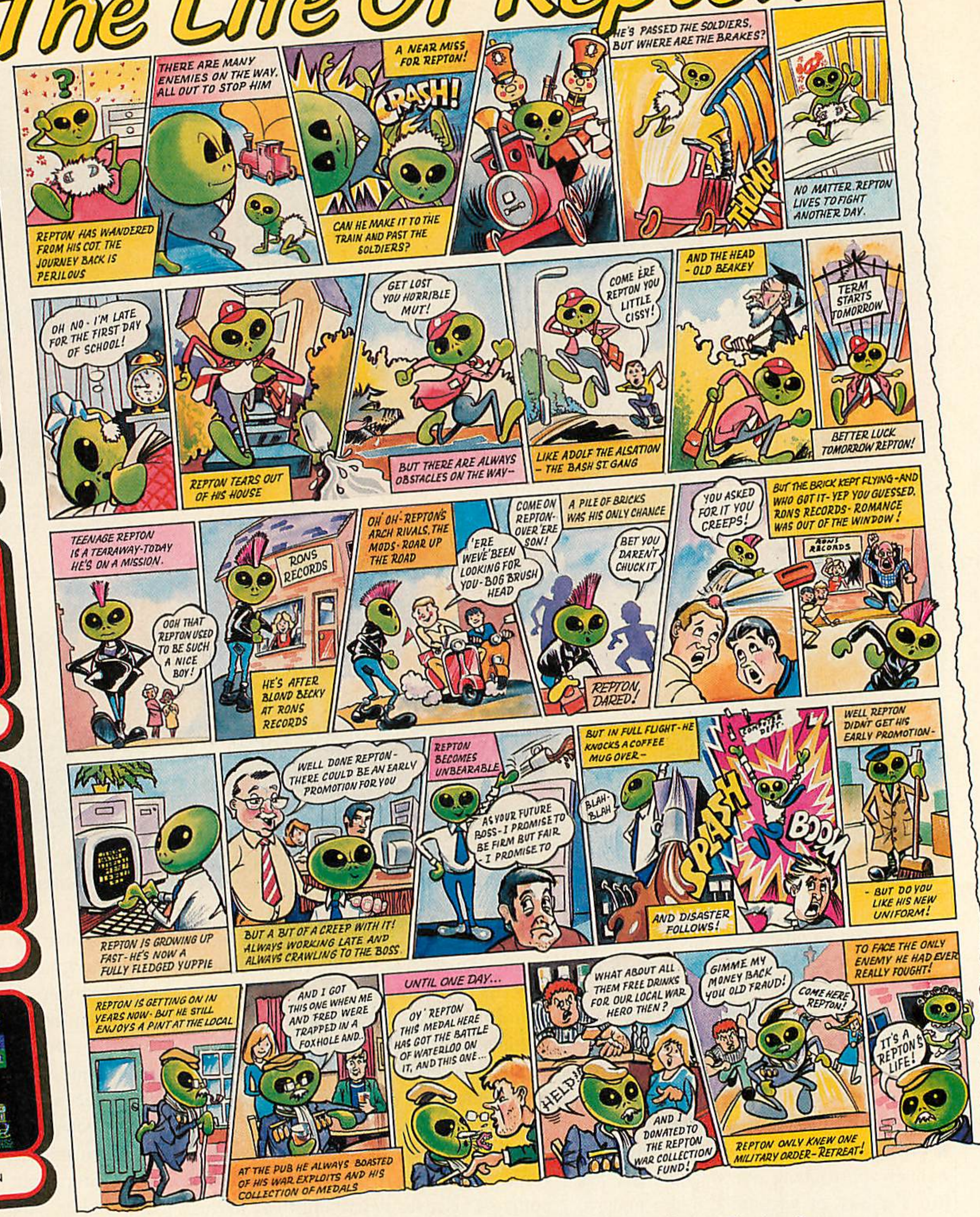
For children to become totally absorbed in a simulation, as this group obviously were, requires the teacher to develop positive attitudes and encourage sound decision making through discussion and a degree of preliminary work. It's evident that a great deal of empathy is generated by this package, as children become aware that the only means of survival involves compromises with the other families in the train.

Each teacher will use this pack in their own manner: often this is constrained by the organisation of the class, curriculum, computer(s) and school. In this case there are a number of activities which could not be done; had a second computer been available, wordprocessing, information retrieval and desktop publishing would have also been available to the children. One group were keen to make a newspaper with reports from various pioneers. A knowledgable visitor might have been found to talk to the children. And had the school been near Bath, a visit to the city's American Museum could have been made as part of the preparations and background study.

The motivation and work generated by *Wagons West* is quite remarkable. The preparation section of the simulation provides the historical background necessary for the children to become aware of the needs and problems of pioneers. What makes *Wagons West* such a valuable teaching aid is the fact that it is original, it encourages lots of group work away from the computer, and it helps to provide a focal point for a wide range of activities.

Wagon's West *is available from Tressel Publications, Lower Ground Floor, 70 Guard Parade, Brighton BN2 2BA. £29.75 on 5.25-inch disc or £31.95 on 3.5-inch.*

The Life Of Repton





REPTON AS A BABY



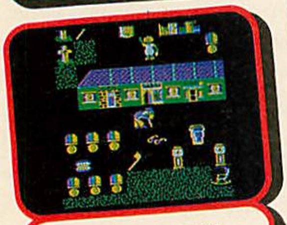
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REPTON AS A TEENAGER



REPTON AT WORK



REPTON AS AN OLD MAN

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EDUCATION

THE NETWORK PAGE

Hook up you new Archimedes to the net and solve all your file transfer problems. Plus a real life tale of networking.

Robin Newman and Simon Thomas

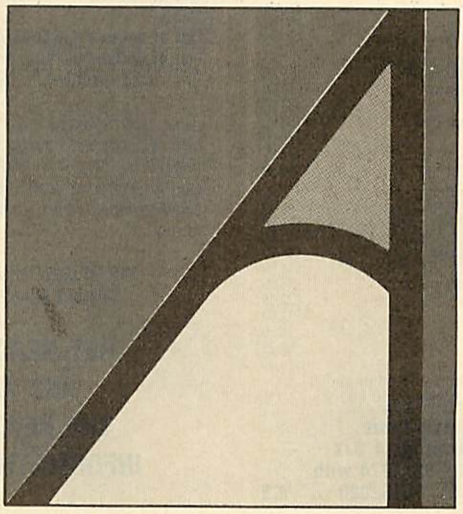
Acorn continues to reiterate its commitment to Econet. To this end, all Archimedes machines are fitted with the Network Filing System (NFS) software built in. All you need to do is fit a standard Master series Econet card to the sockets on the Arc circuit board, and plug in to the net. This procedure is exactly the same as that on the Master series, except you don't fit the NFS ROM.

Early Archimedes have some problems with their software and if you are still using one of the early Arthur operating systems (0.2 or 0.3) then you should be able to upgrade to Arthur release 1. This procedure will be free of charge if you filled in your registration card and sent it off. The new ROMs should be sent automatically to registered owners and there will be a wordprocessing program included too.

People still using Arthur 0.2 may have found that the ADFS doesn't work properly when you have an Econet card installed. To use this, you have to plug the Archimedes into the network, with an active clock signal present, though you don't actually need to log on. The bug is cured in Arthur 0.3 onwards.

A second problem occurs with the use of the symbol '&'. The directory referred to as '&' is the 'user's root directory' on the Econet – the one you go to when you type *I AM. On ADFS, '&' means the same as '$' – the root directory. Thus *DIR &.FRED should select the sub-directory FRED within the user's root directory. This works under ANFS on a Master 128 or Compact, where the command is sorted out inside the ANFS ROM. However, the Archimedes passes the command on to the file server. Acorn Level 3 file servers do not support this command, and this is the reason for the Archimedes' desktop not working properly on such fileservers.

There are two solutions. You can temporarily install the desktop programs within a directory named '&', which will allow pathnames such as &.FRED to work. The second solution is to obtain upgraded software from Acorn already fitted to Filestores. But one word of caution – if you are upgrading a Level 3 file server, then you *must* remove any directories called '&' before doing the upgrade, otherwise you will not be able to access them afterwards.



SJ Research file servers already support the '&' reference to the user's root directory, and will work correctly with programs like the desktop which employ this mechanism. However, there are other problems apparent with SJ fileservers. At present the Archimedes NFS does not allow '%' as a valid character in filenames. '%' is used by SJ for their password file '%PASSWORDS' using the Editpass utility. It is also used for the name of the print queue directory '%PRINTQ', and when accessing back-up tapes directly using the pseudo-directory '%TAPE'. Acorn are aware of the problem, but it is not clear what is going to be done about it.

The new Arc machines will work on a Level 2 file server, albeit at a rudimentary level. But some operations, especially those involving opening and closing files, crash. This file server was written at a fairly early stage in the evolution of Econet when machines like the Archimedes were little more than a dream. It makes little sense to use such a file server with an Archimedes, when the RAM available on a 310 model is bigger than the file server storage capacity!

A feature first introduced with the Master series machines on Econet was the opportunity of selecting a 'Master series specific' library called 'Library1' when you logged on to the network. The reason for this is that you can then automatically select versions of the utilities VIEW, NOTIFY and so on, which have been modified to take advantage of the Master's utility work space at &DD00. A similar mechanism is available on the Archimedes. If you type *CONFIGURE LIB 1 and then press CTRL-Break, the alternative library 'ArthurLib' will be selected, if present, rather than the default 'Library' directory. *CONFIGURE LIB 0 removes this feature. In addition, when you log on with a boot option set, the Archimedes looks for a file called '!ARMBOOT', rather than '!BOOT'. This makes it easier for a mixture of Archimedes and non-Archimedes machines to log on to the same user area, with different boot actions being taken according to the machine type.

Programs can be loaded from the network and run under the 6502 emulator. It is a little disappointing that the emulator doesn't fully support the Osgbpb call which limits the of use Econet utilities. However, a useful selection of software including *Quest* and *Supastore* does work.

Early versions of the Netprint relocatable module do not work very well, in common with the other hard copy modules. However, an upgraded version will be supplied with the full release version of Arthur. Extra Archimedes network utilities are available to set the station number, also for *SETFREE, *RDFREE and *USERS, although they are not supplied.

At the primitive software level, the Arthur NFS supports the transmit and receive functions, but not the peek, poke and remote subroutine jump calls. Acorn are currently discussing whether any additional functions are necessary, but they have not been implemented in the 1.2 release versions of Arthur.

Despite the teething problems, the Arc is viable on Econet. Acorn has demonstrated some spectacular link-ups, but as with any new machine, the problem is getting the knowledge to the people who can use it. Only Acorn can do that.

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List of options in GEDCOM program: Checksum GEDCOM file to IBM PC, Quit, *OS.
List of options in filing program: Amend, Delete, Format, Input, Load, Order (sort), Print, Quit, Restructure, Save, VDU input, *EXEC input, *OS.

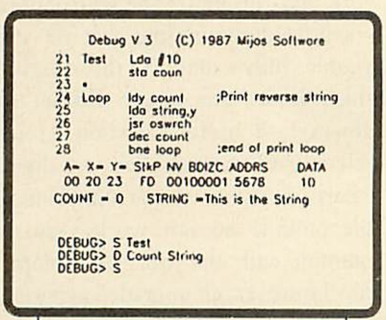
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CASE STUDY

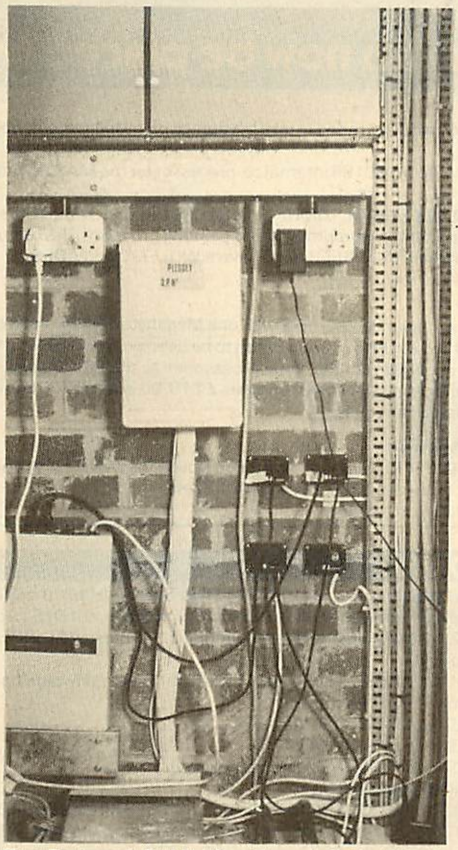
When I switched from chemistry to become head of computer services three years ago, I was faced with a mixture of BBCs and Pets, and with the promise of TVEI, it was clear decisions needed taking. I sold the Pets, and bought extra Beebs as fast as possible. With the help of keen colleagues, some of these found their way outside the computer room and 20 were networked in the business studies area. After a year the net was extended to include English, maths and geography rooms, as well as the library. A Level 3 hard disc file server was introduced, and six months ago, we reached a kilometre of cable with the inclusion of technology, home economics, science, staff room and careers office – 36 computers in 20 rooms.

As use of computers spread across the curriculum, the 'computer studies' courses were phased out and information technology took over the school. Instead pupils took a skills-based course leading to the RSA Computer Literacy and Information Technology (stage 1) certificate. This course is now completed by the end of the third year, and information technology is no longer offered as a descrete option course at 14-16. The hope is that the skills gained will be used widely throughout the curriculum as a matter of course.

Reasons for networking

In order to achieve the school's policy of integrating information technology into the curriculum, it was important to spread equipment into key areas of the school. But in doing this, there is always the danger of computers gathering dust in cupboards. It is not enough merely to give the computers to teachers – they are often reluctant to waste time struggling with disc faults and poor manuals. We agreed that a network should be able to provide a system whereby software can be readily loaded from the file server, through a helpful and comprehensive menu. Appropriate help frames should be accessible to teachers and pupils with the minimum of trial and error.

The *I AM command is the only thing a user has to remember – everyone is 'booted' into a menu program requiring only single key presses. Wordprocessing takes the lion's share of the file server's attention, as is often the case. But a variety of computer-aided learning software, especially simulations are also widely used. This isn't always in the lessons you'd expect.



The Redwood Publishing Econet links 50 stations. Above, the Bridge and connection sockets that allow the network to be split into two sections for maintenance.

A fourth-year project to create a school viewdata system, using Communitel software, has resulted in a large project information section. Edited pages from Prestel, Times Network and teletext abound among the 300 or so present. But it is also being used by teachers to give help with projects and homework, and by pupils reporting the results of projects for the benefit of others. Outside users can call the Communitel host system on (0403) 56468 after school hours or at weekends and holidays – the network runs 24 hours a day all year round. Teletext is available throughout the network, using the telesoftware utility from Ceefax.

Problems

The installation of the original Acorn Level 2 file server-based system was prolonged by several of our own mistakes. In future I'll leave network upgrades of model B micros, to the professionals. Insisting on 'proper' cabling, however, was one piece of advice I did follow, to our undoubted benefit when it was later extended. Another good idea was to incorporate a junction box, which allows the network to be split into a number of physically separate parts when necessary – for example to isolate faults. 'Line jammed' errors are the most frquent, and are usually caused by a fault in a socket box or a broken computer. The IC 93, a 75159 line driver is a common problem.

One other problem was a file server error 36 – a corrupted password file – which meant a complete reformat of the 30Mb Winchester. It showed up the need for more frequent archiving. Why do we always have to learn the hard way? We now back up to about 20 DFS floppy discs every few weeks, which takes about an hour and a half. Having a tape streamer would certainly encourage us to do so more frequently.

Acorn has been slow to assist when things have gone wrong, which seems poor after having to spend so much money to obtain their Level 3 file server software. A complaint about a bug in the 'Level 2 to Level 3' conversion utility took six months to fix.

The Winchester is currently awaiting repair. A fault, probably in its drive controller, means hiring a replacement for as long as it takes for Acorn to mend it, plus extra work of restoring an archive copy of the old files. A Winchester seems safe enough until it fails – ignore backing up at your peril.

Has it all been worth it?

It's hard to judge the extent to which the acceptance and widespread use of computers by school colleagues can be attributed to the network. Many argue that even more progress could have been achieved had the money been invested in work stations instead of the Winchester and 'wire'. Managing the network, even with a part-time technician, takes an immense part of my time. On the other hand, with nearly 200 units of hardware to look after, you must expect to spend time keeping them working. And how much time would be needed to ensure that everyone had access to up-to-date copies of several boxes of floppy discs?

Deciding to run a network is a big commitment, and a major responsibility. Strong contingency plans and a cast-iron tolerance of machinery are needed by the person who has to pick up the pieces when the network fails. For the users, however, I am convinced that the more the system develops, the more we will provide an entrance to the strange world of information technology which would otherwise remain locked and barred from the inside.

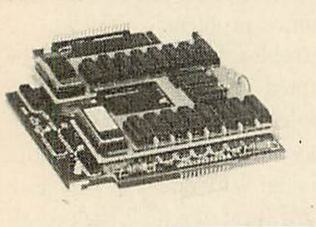
Simon Thomas is head of computer services at Tanbridge House School.

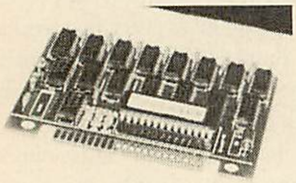
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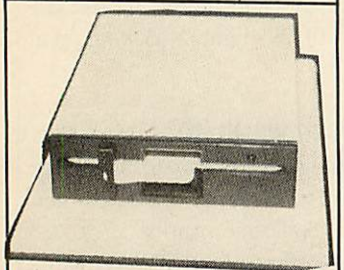
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The PC-PLUS is an expanded PC-500, with one Megabyte of RAM instead of 512K. The extra memory allows large applications such as Desk Top Publishing (eg Fleet Street Editor) to be used on the BEEB or the MASTER.
The PC-PLUS is supplied with the same accessories as the PC-500 including the mouse and 4 discs. Price **£339 inc.**
Upgrade from an existing Acorn 80186 costs **£119.00** but you will be required to sign a service agreement. Please ring for details.
Data sheet available on request.

MASTER MEGA CARD:
The MEGA CARD (256K) plugs into a cartridge slot on the MASTER and adds instantly 256K of RAM. The card can be used as RAMDISK, printer buffer or sideways RAM. Price **£100.00 inc.**
Data sheet available on request.

It's Easy To Masterise Your Beeb

With Solidisk Add-Ons!

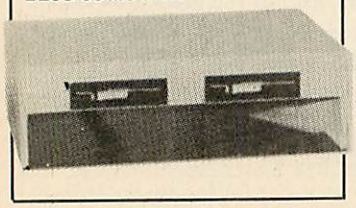


DOUBLE-SIDED 5¼" DISC DRIVE

This is a superb 80 track, double-sided, dual density, lever type and very fast disc drive. Unformatted capacity: oné Megabyte. 40/80 track manual switch optional as most Acorn and Solidisk DFS have software switch. Supplied with data and power lead (please specify your computer), *Price* **£119.00 inc VAT.** 40/80 track manual switch if required: **£2.00 inc VAT.** Separate PSU if required: **£25.00 inc VAT.**

TWIN DOUBLE-SIDED 5¼" DISC DRIVES

Complete with bridge unit, suitable for both BBC and Master 128K, *Price* **£238.00 inc VAT.**



WD-1770 DFS:

The new Acorn Disc Filing Systems DFS and ADFS require both the WD-1770 chip. Solidisk offers two basic WD-1770 models which are totally compatible with the Acorn DFS/ADFS ROMs. We also offer our own DFS 2.2 and ADFS 2.1 ROMs which have a superset of utilities and commands. Data sheets on these ROMs are available on request.

1) WD-1770 DUAL DENSITY DISC INTERFACE for previously tape based BEEB. This is the standard Acorn disc upgrade since 1985. Prices are:

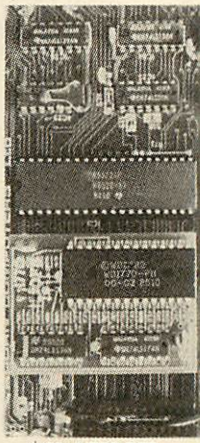
WD-1770 DDFS without DFS ROM	**£35.00 inc.**
WD-1770 DDFS with DFS 2.2 ROM	**£45.00 inc.**
WD-1770 DDFS with ADFS 2.1 ROM set	**£55.00 inc.**

Data sheet available on request.

2) WD-1770+8271 (DFDC) DISC INTERFACE: for BEEB already equipped with the 8271. This system allows you to keep the existing 8271 disc interface while adding the new WD-1770 chip. It has a simple switch to allow changing between the 8271 and the WD-1770. To operate the hardware, you will need either the latest ROMs from Acorn (8271 DNFS 1.2, 1770 DNFS and 1770 ADFS) or Soidisk ROMs. If you are stuck with old or inappropriate DFS software, buy the inexpensive DFS 2.2 ROM. Prices are:

DFDC without DFS ROM	**£45.00 inc.**
DFDC with DFS 2.2 ROM	**£50.00 inc.**
DFDC with ADFS 2.1 ROM set	**£55.00 inc.**
DFDC with 2.2 and 2.1 set (3 ROMs)	**£63.00 inc.**

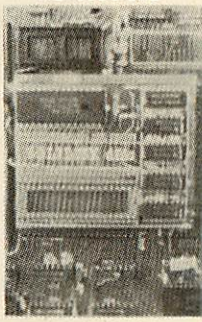
Data sheet available on request.



WD-1770 DFS

TWOMEG 128K: Number One Best Seller!

The new style TWOMEG 128K add-on board for the BBC is the closest emulation of the Master 128K ever achieved. It combines Sideways RAM, Shadow RAM and four extra Eprom sockets (4 on the BBC motherboard) in a single product. It is unobtrusive and easy to fit, just drop in and go!
It's the ideal upgrade for all Beebs, with more ROM sockets and even bigger memory than the Master! Compatible with Computer Concepts InterWord, Sheet and Spellmaster, Acorn View 3.1, ViewSheet, ViewStore and Basic, it is supplied with a quantity of useful software on five discs, eg database, spelling checker, macro basic, Ramdisk for STL DFS and ADFS etc.
A clever switch write-protects only the 8 banks of Sideways RAM, without affecting the Shadow RAM. *Price: ex VAT:* **£52.17, inc VAT £60.00**



1770 + 8271

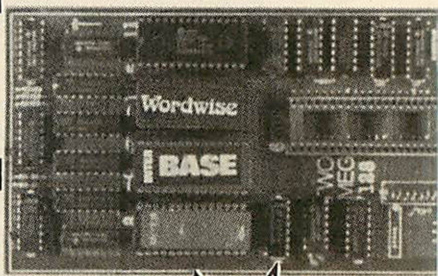
FOURMEG 256K:

256K RAM (shadow and/or Sideways) 4 extra H/C ROM sockets on board (4 on BBC motherboard), 4MHz switchable CMOS 65CO2 cpu, 32K Manager ROM. *Price* **£110.00 inc VAT.**

TWOMEG 256K:

256K RAM (shadow and/or Sideways) 4 extra H/C ROM sockets on board (4 on BBC motherboard), 2MHz CMOS 65CO2 cpu, 32K Manager ROM.
Special Offer on InterWord and Wordwise Plus when purchased with any TWOMEG or FOURMEG board:

Wordwise Plus:	**£30.00 inc VAT**
InterWord:	**£50.00 inc VAT**



TWO MEG 128

Only £60 inc VAT!

REAL TIME CLOCK:

gives your Beeb time, date and configure facilities similar to the Master. *Price* **£29.00 inc VAT.**
SWR32: 32K Sideways RAM, base unit and disc. *Price* **£20.00 inc VAT.** SWR 64: 64K Sideways RAM, 2 H/C ROM sockets on board, base unit and disc. *Price* **£30.00 inc VAT.**

EPROM PROGRAMMER:

The UVIPROM is the cheapest Eprom programmer on the market, yet the easiest to use. UVIPROM for programming 2764 and 27128 (21V): **£20** UVIPROM-32 for programming 27256 (12.5V): **£20 inc VAT.** MULTIPROM, the deluxe version, programs most types of Eproms and fitted with TEXTOOL ZIP socket, *Price* **£44.50 inc VAT.** The UVIPAC (Eprom Eraser) can erase any 3 Eproms in approximately 15 minutes, *Price* **£20.00 inc VAT.**

MASTERPLAN:

If you are thinking of exchanging your BEEB for a MASTER or an ARCHIMEDES, Solidisk MASTERPLAN is for you. We can quote immediately over the phone the buy-back value of your BEEB and the balance on your new system. So please give us a try!

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVENUE, SOUTHEN

ARCHIMEDES Computers

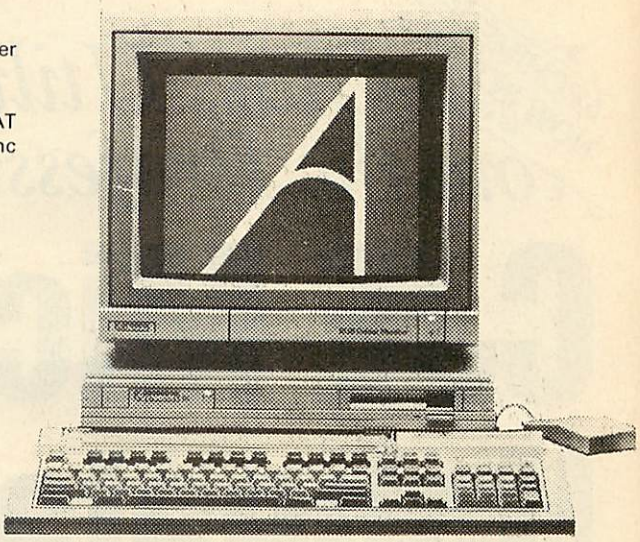
A305 PLUS, 1 Megabyte of RAM: £731 + VAT

v A305 upgraded to 1 MB, same as 310
v with Acorn colour monitor: £913.50 + VAT
v with Philips colour monitor: £930 + VAT

A440: FREE NLQ PRINTER, £2,299 + VAT

v 4 MB OF RAM, 20MB Winnie, built-in floppy drive,
v build-in packplane,
v free EPSON FX80 compatible NLQ printer (Panasonic KX-P1081).
v with Acorn colour monitor: £2,481 + VAT
v with Philips CM8833 monitor: £2,498 + VAT
v super discount available on Multisync monitors, please call

BEST DEALS



Please note:
Many packages such as Acorn Arc-Writer or Logistix leave little room on the program disc so that a second drive is very useful. Unless you plan to get the 20MB Winchester, our external drives (eg FD35A) are good and low cost.
If you are going to use the MS-DOS Emulator, we recommend our FD525A, 40/80 track switchable because most PC software is still supplied on 5¼" format. For 100% media compatibility, you will need a 40-track double sided 5¼" drive, such as our PC525 (see below).
The way the new Arc software is going, everyone will sooner or later send to upgrade the memory to 4 Megabytes (and even beyond). If you can't afford an A440 now, you can trade-up from your 305 Plus. We will normally allow you 85%-95% of our invoice value.

ACORN ADD-ONS:

	normal
20 MB Hard Disc (AKD52)	£499.00
2-slot Podule Backplane (AKA01)	£39.00
ROM Podule (AKA05)	£39.00
I/O Podule (AKA10)	£79.00
MIDI add/on to I/O Podule (AKA15)	£29.00

Please add VAT to the above prices.

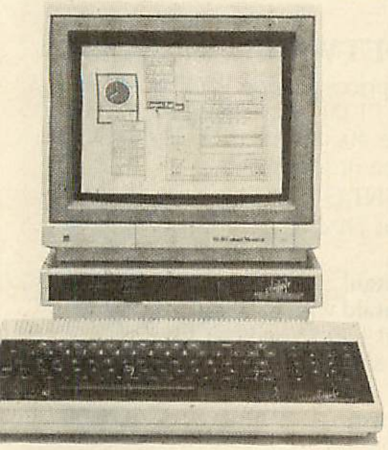
registered customers

6% DISCOUNT

SOLIDISK ADD-ONS:

3.5" second drive (FD35A, external)	£100.00
5¼" second drive (FD525A, external)	£110.00
ARC-SAVER (released soon): (4-slot podule backplane with Thermi-fan)	£49.00
Dual user port podule short:	£13.00
Dual user port podule long:	£16.00
Eprom Programmer to be used with our Dual for 27C128:	£18.00
Multi-Prommer for all types:	£39.13
Eprom Eraser:	£17.39
Teletext and TV adapter:	£87.00
Image-Master (video digitiser):	£52.17
Advanced Image-Master:	£156.50

Please add VAT to the above prices.



COMPACT 128K:

	Without monitor ex VAT	inc VAT	Acorn monochrome ex VAT	inc VAT	Acorn colour ex VAT	inc VAT
Compact 128K:	347.80	399.97	391.30	449.99	521.00	599.15
Compact 128K, CDFS ROM and a second disc drive, A, B or C:	434.00	499.10	478.00	549.70	608.70	699.99

A = twin 3.5" drives, B = 5.25" drives, C = one 3.5" and one 5.25".
Twin drives are usually required for disc copying, the Solidisk CDFS complements the Acorn ADFS with a superset of DFS commands and utilities such as single and double density, copying DFS discs to ADFS discs etc.



MASTER 128K:

	Without monitor ex VAT	inc VAT	Philips monochrome ex VAT	inc VAT	Philips colour ex VAT	inc VAT
Master 128K:	391.00	449.65	455.00	525.25	574.00	660.00
Master 128K with Twin disc drives:	556.50	639.97	635.00	730.25	730.43	839.99

The MASTER 128K comes bundled with Wordprocessor (View), spreadsheet (ViewSheet), Terminal software, DFS and ADFS. The monochrome monitor is 12", can be with green (BM7022) or amber (BM 7522) phosphor, the colour monitor is 14" CM8833 with all imaginable inputs! (The Acorn colour monitor is a badged version of the latter.)
PLEASE NOTE: generous TRADE-IN allowances are available for upgrading your present system. Please call for immediate quotation.

TELETEXT AND TV ADAPTER

This unit includes a programmable TV tuner, a teletext adapter and a mains power supply unit. It has one input for the aerial and two output sockets. One socket is for connection to the computer and the other for composite video and sound, for connection to a suitable monitor such as the Philips CM8833. It is supplied with software on disc for any of the following computers: BBC model B, Master, Compact, Arc, ST and Amstrad PC. Unlike the ATS ROM (Morley version) with which it is fully compatible, it can download software for any other computer than the BBC. It can be used as a conventional TV tuner, except that channel selection is done by software and the details saved to disc (so that you can watch football at work!). Price: £99 inc. VAT (please specify computer and disc format).

IMAGE-MASTER:

This cost-effective video digitiser converts directly composite TV signal (camera, VTR, teletext adapter etc) to computer display. Image-Master resolution: 640 × 256 by 16 colours or shades but the computer display resolution is limited by your computer. Available for Arc, BBC, Master, Compact, ST and Amstrad PC. Price: from £60 inc. VAT (Please specify your computer, Arc model requires our user port podule). There are one input (composite video in) and two outputs (video out and to computer), 3 knobs (brightness, contrast and aspect ratio). The unit should be used with a suitable monitor such as the Philips CM 8833.

ADVANCED IMAGE-MASTER:

This digitiser can not only convert video signal into computer data, it can be used as a super colour display for the computer and replaces a GENLOCK device for picture over picture. It is capable of 4096 colours, 640×256 pixels and output for recording onto video tape or RGB (analog) monitor. There are two inputs (computer display in and camera) and 3 outputs (VTR out, Analog RGB out and computer data). Available initially (JAN 1988) for Arc and ST. Price £180 inc. VAT. Data sheets are available on request.

****
DTP SYSTEM INC. LASER PRINTER: £2499 + VAT!
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All items can be ordered by post, sending the coupon below and enclosing cheques, POs, drafts or credit card numbers or by phone. P and P is charged as follows:
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Up to 3 KGs (eg single disc drives): **£3.00**
Up to 10 KGs (eg computer, monitors, printers, twin disc drives): you can specify either parcel post £6.00 or courrier/Datapost: **£12.00.**
Above 10 KGs (eg complete system), please either allow generously or give us a ring for quotation.

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(MICRO USER JUNE 87)

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NOW – Solidisk 256K version is also available.

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This switch system selects RAM protected, RAM unprotected or ROM. Each bank is separately switchable. This is the MOST POWERFUL switch unit available at only £15.00 inc VAT. (p & p £1.00 extra).

CJE micro's

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SOFTWARE PRICE LIST

All prices include VAT, but please add £1.00 for postage/packing and state 40, 80 track or 3½" ADFS when ordering.

MFNLQ	**£30.00**
Font Discs B, C & D each	**£15.00**
Fontaid	**£30.00**
Fontaid with 6264 RAM	**£36.00**
Font Discs A, B, C, D, EA & Lang each	**£15.00**
Inform	**£20.00**

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Delivery on all printers is free. Ring for a sample printout, specification and the latest prices.

The following Near Letter Quality printers all come with centronics interface, friction and tractor feed.

Panasonic KXP1081	**£180.00**
Canon PW1080A	**£260.00**
Star NL10	**£230.00**
Star NX15	**£410.00**
Star NB24/10 (216cps)	**£599.00**
Juki Daisywheel	**£330.00**

Free delivery on printers

CJE Printer packs

The CJE packs include; Cable, delivery, paper, plug, utility software and booklet. Please ask for further details.
The Printer packs cost £15.00 with printer: e.g. NL10 + pack = £260 + £15 = £275 inc. VAT.
BBC Cable if purchased separately is £8.00. Software on its own: £11.00 + £1 p&p.

FREE ADS

BBC B Penpal wanted into adventure games. Contact Aran Johnson, 4 Whackhouse Lane, Yeadon, Leeds LS19 7LY.

Penpals wanted BBC with disc drive, swap tips etc. Contact K Sall 164 Anglesey Road, Burton-on-Trent, Staffs. DE14 3NP.

Wanted: BBC penpals, tape or disc. All letters answered. Write: Paul Tang, 21 Main Street, Branston, Burton-on-Trent, Staffs. DE14 3EX.

BBC B 1.20, Viglen 40/80-T disc drive, four meg 32k, expansion, *Inter Base*, graphics ROMs. Many games. £450. Tel (0892) 29672.

Toolkit ROM by Beebugsoft - original with manual. £5 to include postage. Tel: (0905) 429967 after 7pm.

BBC B, dual Mitsubishi 80-track drives, steel CPU and keyboard cases (plus original), Hi-Res green monitor, ADFS/DFS, *View* 3.0, Books. £400. Tel. (0730) 61901.

Master 128k, dual DSDD disc drives, Olivetti JP101 printer, mouse, max, ADT £700+ original software. Sell £700. Tel. (0572) 55520 after 6pm.

Original mint condition, all manuals. *Romit* £12, *Movie Maker* £14, *Fontwise Plus* £10. Tel. Nottingham (0602) 602180.

HRC external ROM box (Model B) for 24 ROMs. 64k battery backed RAM. £55 inc. J. Follett, 26 Arbor Lane, Winnersh, Berks RG11 5JD.

Viglen BBC B console with dual DS 40/80 drives, power supply keyboard case, manual, utility disc. Cost £278 asking £175. Tel.(0288) 3100.

Exmon II machine code monitor for BBC B £15. Tel: (0642) 486470.

Cumana CSX200 disc drive 40/80 track switchable £50. BBC Master AMX Mouse £35. Tel: Dave on Sheffield (0742) 620989.

Aries B52 board virtually new, £50. 40-T single side disc drive (Viglen) £30. Tel: Basingstoke (0256) 468997 after 6 pm.

Quickshot II Joystick and First Byte interface with conversion software. £20.00 ono. V.G.C. Boxed. Will swap for Electron goods. Tel: (0905) 423255.

BBC bits, SS 80-T drive, £40. Raven-20 shadow RAM board £20. ISO-Pascal, £30. Swaps considered. Tel: 01-673 4492 (evenings).

BBC micro 1.20 OS excellent condition £175. Tel: Mansfield (0623) 643899.

Printer: Mannesmann Tally 80. Excellent condition; with extra software if required (eg screen dumps) £100. Tel. Taunton (0823) 443270.

Wanted: Disc drive with PSU and Epson printer or similar. Must be as new. Tel: (0888) 63668. After 6pm.

BBC B, wanted DDFS, twin 80-track drives, 32k RAM card, £300. Epson FX80, £140. X-Y plotter (IEEE) + BBC interface, £140. Tel: 0763 60496 (evenings).

Electron Plus 1, *View* + *ViewSheet* cartridge ROMs and mini office, data recorder and selection of games. £125 o.n.o. Tel: (0734) 732820.

BBC B Watford DFS, AMX Mouse MkII, 40/80 400k drive + discs + software + ROMs, £295 ono. 400k drive, £50 ono. Tel: 061-456 9293.

View (2.1) original packaging, plus manuals, modified for use with shadow RAM, £20. Contact Dr Wears, Tel: 061-205 2393.

Penpals wanted, swap hints tips. Electrohome monitor medium resolution, £110. *Doctor Who and the Mines of Terror* £5. *Super Art*. £30. Tel: 01-969 5659.

Selling complete BBC system or may split. Beeb, drives, teletext, printer, monitor etc. For complete details, Tel: (0942) 824532.

Wanted teletext adapter with ATS ROM Warwick. Tel: (0926) 402891.

32k Watford shadow RAM six months guarantee. Was £70, will sell for £50. Tel: George 01-847 4375. Office hours.

BBC B 1.2OS, Watford DFS 80-track DS/DD disc drive, tape recorder, joystick, software, books, £320. Tel: Dave 01-764 6276 (evenings).

Wanted BBC B any model, any condition. Tel (0279) 731340. After 6pm.

Prism acoustic modem, excellent condition, includes software & leads. £40.00 ono. Tel: Daniel (0284) 87583.

Wanted Challenger disc drive and manuals. Tel: (0635) 34891. After 7.30pm.

BBC B issue 7, Acorn DFS +DS 40/80-T drive. APTL ROM board, shadow RAM, monitor in console unit £500. Tel: John (0865) 274397.

Music 5000 synthesiser and Music 4000 four octave keyboard for BBC computer £130. Tel: (0582) 581468. After 5.30pm.

BBC micro wanted. Also other BBC equipment. Tel: (0353) 721736 evenings.

Wanted 6809 development system for Beeb (prefer CMS system with flex/DOS, software and manuals). Tel: 021-503 0212.

Microline 82A dot-matrix printer parallel and serial interface, friction and tractor feed, 120 cps bi-directional. Includes cable manual. £140. Tel: (09363) 3300.

Electron, Plus 3, ROMbox, plus word processor, T2P3, database disc, 15 discs, games, books £200 o.n.o. Tel: (0753) 821955. After 5.00pm.

BBC B 1.2OS DFS £250. ROMs *Wordwise*, *Doctor*, Exmon, Solidisk 256k manager £ various. Tel: Langport 250130.

BBC B OS1.2 Acorn DFS Aries B32 shadow/sideways RAM *View* 3.0 £280 ono. Tel: Little Chalfont (02404) 4617 (Bucks).

Electron, Plus 1, Plus 3, data recorder, T2P3(2), 27 discs, Slogger joystick, tapes (35), EPROM holder, leads, power SU, excellent condition, £600 o.n.o. Tel: 091-286 5850. After 6pm.

BBC screen 40/80 switchable drive DDFS ROMs wp software, leads, sideways RAM/ROM board 32k. £375 negotiable. Tel: eve. 01-458 1596.

Master 128, 400k DSDD, Philips colour monitor AMX Mouse, two joysticks, 32k s/ways RAM cart, two ROM car, & £500 discs, ROMs, manuals. For more details/offers, £850. Tel: 061-485 3914.

BBC B OS 1.2 with *InterWord* £200, Opus challenger 40/80-T +256k RAM disc £100. Books, discs, software, as new £300. Tel: (0308) 24481.

Opus DDOS complete, £25. Tel: 0621 893048.

Swap disc interface Acorn for a Oric / Atmos disc interface and DOS. Tel 051-449 2044. Michael (8271).

BBC Master £350. Two disc drives £150. Teletext £85. Master to B £30. For £800. Tel: (0534) 20319. After 6pm.

Master 512 inc manuals plus dual 40/80-Trk D/sided drives, plus Microvitec colour monitor, plus Epson FX80 printer £1200 ono. Tel: 01-859 2649.

Wanted: Teletext adapter (Acorn) must have advanced (ATS) ROM. £40 approx. Write: J. Sturgeon, County College, Lancaster University, Lancaster LA1 4YD.

Cumana QFS 2,0 double density DFS £35. *View* 2.1 boxed as new £25. Superior Software *Speech!* £5. Tel: (0827) 830660.

Electron, Plus-1, graphics ROM, *View*, *ViewSheet*, Lisp, second processor kit, advanced user guide, games, utils, mags. £130 (ono). Tel: 051-546 1543.

BBC disc, tape, monitor, £25. Software, extras. Cost £35, only £16. Buyer collects, (West Yorkshire). Tel: Cameron on (0924) 258624.

Econet hardware, two terminators, system clock, three power supplies, three DIN / DIN leads. New, £25. Electron *ViewSheet* ROM cartridge unused, £9. Tel: (0703) 263618.

Alphacom 81 thermal printer, BBC interface, 4 rolls paper, as new £35. BBC 40-T disc drive, complete £20. Tel: (0353) 740674, anytime.

EMR BBC MIDI interface unit with *Composer* and *Performer*, software £70. Solidisk DDFS with DFS 2.2 ROM, £30. 32k sideways RAM, £15. Tel: (0562) 60242.

BBC B issue 7 Acorn DFS and ADFS, two drives, light pen, speech synth, 50 discs, joystick, bargain £320. Tel: (0226) 203221.

Co-Processor, Cambridge 16032, plus software, as new, £800 or offers. Tel: Portsmouth 751873.

Printer: Mannesman Tally Spirit-80, boxed with manual etc, Excellent condition. £110. Tel: Taunton (0823) 443270.

BBC B with Cumana D/S D/D dual 800k drives R/board, j/sticks, Forth, Pascal, *W/Wise* + s/ware, leads and manuals. £350. Tel: Don, 01-850 5604 Evenings.

BBC B including *Speech*, DFS, sideways RAM £175. Z80 second processor £175. 6502 second processor, Cumana double drive £175. More. Tel: (04024) 74633.

BBC B Acorn DFS 40/80-track disc drive 32k, Solidisk sideways RAM, Enigma disc ROM, 20 software discs, £350. Tel (0252) 617962.

Voyager 7 modem with *Commsoft* ROM, including leads. As new. £70. Tel: alton (0420) 63554.

Kaga Taxan Supervision III colour monitor, 664x 312 resolution, £225 ono. Tel: 01-366 5881. Evenings.

BBC B software, 75 discs full of excellent software. Disc format is:- 80T DS SD £100 o.n.o. Tel: Vinlent on (05086) 3517.

Forth on the BBC, Grandis Harrison £5. *Starting Forth* Leo Brodie £10. Tel: 021-353 4673. Evenings.

BBC Master turbo plus reference manuals, parts one and two, £400. Sanyo green screen hi-res monitor £50. Tel: 040-22 20305.

BBC B, Opus DDOS, 40/80-drive + PSU, AMX Mouse, much AMS software, joystick, Hitachi TV/monitor, disc etc. Worth £2000, as new. Offers. Tel: 01-228 6339.

Wanted for Electron: Plus 3 or equivalent. Also printer (send sample). Kramer, 173 Sharoe Green Lane, Fulwood, Preston PR2 4HE.

BBC B 1.2OS, 1770 DFS, ADFS, 16k SWR, ROM board, datacorder, 3B twin joysticks, software and books. All manuals and leads included. £310. Tel: Kingswinford (0384) 274693.

BBC B Torch Z80, two 400k drives, Kaga 12-inch monitor, Epson FX80, perfect software, Basic £500. Tel: (09276) 6365 (evenings).

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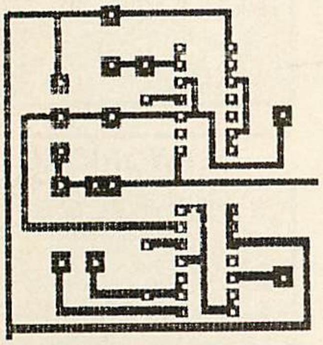
How to trace a short circuit

With the Joe's Jottings programs getting longer every month, it can be hard to tell if they are going to work first time after typing them in. The PCB design program from December '87 works perfectly well. But one reader phoned to tell us of his difficulties.

He got the program working up to the point of printing out his finished design. The problem came when he was unable to dump the design to his daisy-wheel printer: he didn't have a daisy-wheel screen dump program. So he resorted to tracing the design onto a piece of paper stuck over the monitor screen. Finally, the PCB was exposed and etched.

'Why won't my components fit?' he asked over the phone. 'What size is your monitor?' we replied. 'Is it 12-inch or 14-inch? Or is it a 26-inch TV?'

There was silence at the other end of the line.



Do not adjust your PCB

The Prince and IT

There must be some nervous people in Calderdale, West Yorkshire, chosen as the site for a new technology centre.

Work has begun on building 'a giant £8-million educational workshop exhibition'. Acorn is helping by supplying the computer equipment, including four Archimedes.

So why should anyone be nervous? According to an informed source the project was launched by Prince Charles, and is being partly funded by the Prince of Wales' Inner City Trust. How would you like to work on a new building knowing the Prince's feelings about modern architecture.

At the opening ceremonies, Charles was invited to watch school children 'using Archimedes machines to acquire graphical development'. It wasn't made clear whether the kids were actually designing the building, although mention was made of a 'moving graphics program about a man splashing around in water'. Was this the architect? More to the point, was he waving or drowning?

Hacks' turn for the worse

A press of hacks leapt up the Telecom Tower in London recently to take a spin in the revolving restaurant – except that it wasn't going round.

Telecom spokespeople explained that the power points and phone lines were all in the stationary core of the tower, but the computer systems being demonstrated were out by the windows. If the tower had been turning, all the plugs would have been pulled.

'They could at least have had it wobbling – turning a bit to the left and then back again,' grumbled a thick hack.

Sack the post

Acorn recently dispensed with the services of 49 staff. One major benefit was that these people were asked to clear out their desks – and some interesting papers have surfaced. In particular, someone must have found a batch of old orders. The BBC has since been invoiced for £499, for a Master 128 it bought back in February 1986. It is not clear whether Acorn sacked its post boy among the 49.

Now you see it, now you don't

At a recent London show, ace reporter Orson Fact was searching for new products to review. Aisle upon aisle of earnest searching provided a meagre haul: a new *View* printer driver (yawn), and a way of running two copies of *View* at once – one for either hand. There was little that hadn't been around for months. But then one stand bore unexpected fruit – a demonstration of a new digitiser. Hailed by its designers as low-cost, high-quality and 'almost ready for sale', the equipment raised some interest.

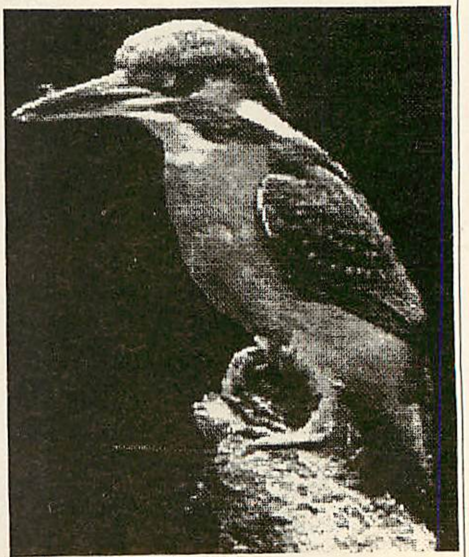
Digitisers are all the rage at the moment. These handy devices take video input from a camera, video-recorder or even 'off-air', and convert the picture into a normal BBC screen image. Load that into another art package, and *voila*, you've created an instant masterpiece.

'Would there be a possibility of one for review?' asked the fresh-faced Orson.

'Yes, of course', said the representative on the stand. 'No problem. Just let us know when you want it, and we'll build a prototype for you.'

Were there stocks sitting in a warehouse 'almost ready for sale'? Or was the one at the show the only one?

Perhaps it was all just a bad dream, after all, although Orson maintains the illusion seemed quite solid.

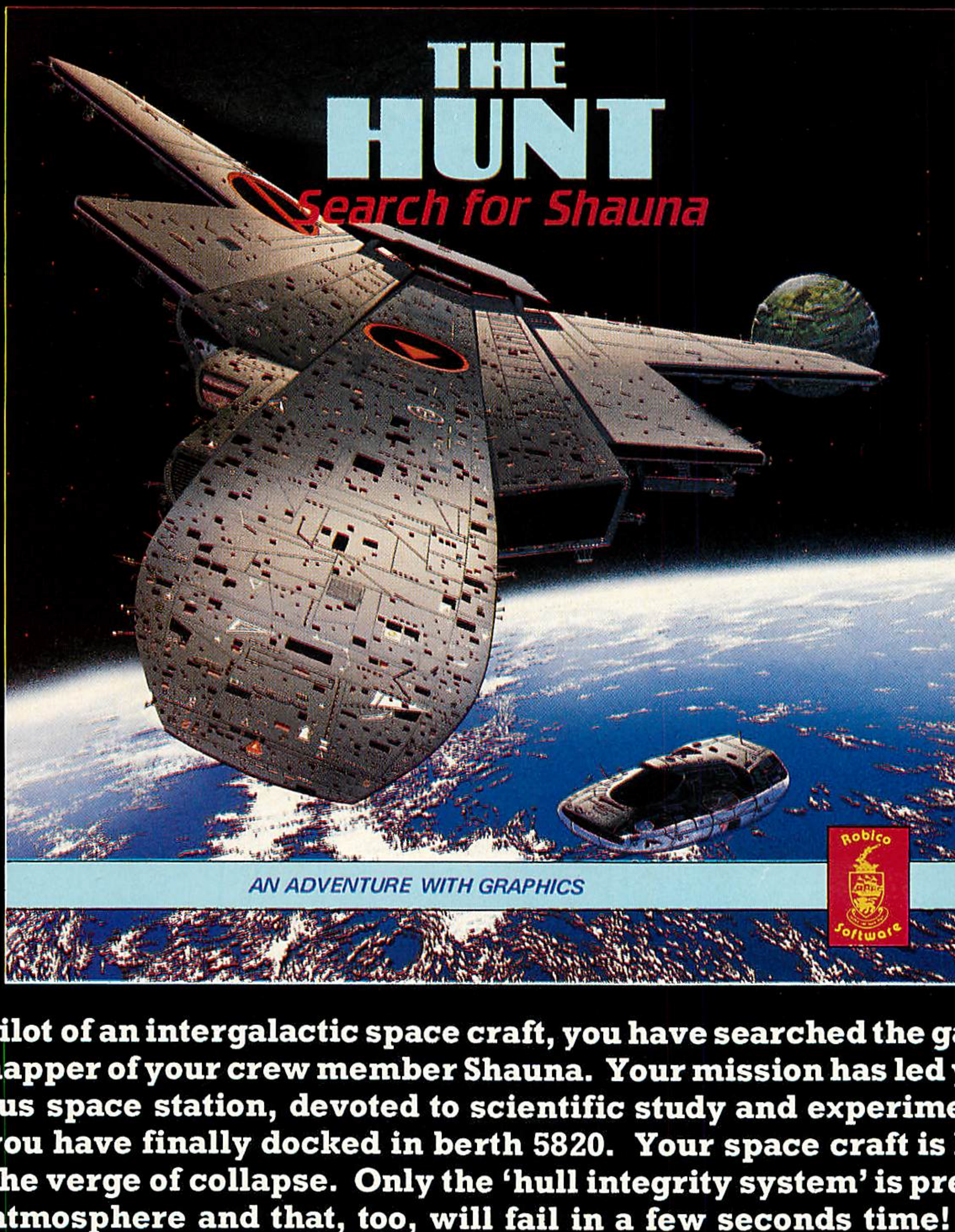


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